LE5-LR mV/V Input Dataloger
Large Digit Displays
Operation and Instruction Manual

Table of Contents

1 Introduction

General description

This manual contains information for the installation and operation of the LE5-LR data logging load display with ethernet and data logger memory. These displays can accept 4 wire mV/V input or 6 wire mV/V input.

Some of the required setup functions are accessible via the instruments pushbuttons and these are also accessible via the Windows software supplied. Some setup functions are only available via the Windows software. Those available via pushbuttons are shown in the **Function Table** and **Explanation of Functions** sections of this manual. The remainder are shown in the **Window Software Introduction** section.

In addition to the logging capability load spectrum functions allow monitoring of load spectrum parameters for crane and hoist in addition to storing the load data logging records.

The data log records, live data and other usage data and setup functions can be obtained via the supplied Windows software or via the instruments web page. The Windows software can be accessed via the standard Ethernet connection or when fitted or via the optional USB port. The Windows software allows selection of method used under **Settings** > **Comms**.

The display can be scaled in engineering units e.g. "tonnes" by entering the values required at two known applied loads using the **CAL 1** and **CAL2** functions found in the **I.NPE** section. The calibration procedure can also be undertaken remotely via the PC software via **Advanced** > **Calibrate**.

In order to calculate the DWP of the crane/hoist the relevant sections of the DWP section such as hoist class and crane class must be entered via the Windows software. The method of calculating the load spectrum parameters is based on the Australian Standard AS2550.

Four relays are fitted as standard with Relay 1 being dedicated for DWP use.

Basic commissioning

The basic requirements are:

1. Install the Windows software on your computer or laptop, connect the computer to the instrument using the Ethernet connection or an optional serial communications such as USB. Run the software and check that the instrument is communicating with the computer or laptop. Check the **Passwords** section of the **Windows Software Introduction** chapter for details of using passwords.

2. Wire in the required power supply as shown in the **Electrical Installation** chapter.

3. Wire in the 4 or 6 wire load cell as shown in the **Electrical Installation** chapter. Set the **I.EYP** function to match the type of load cell.

4. Wire in the required relays as shown in the **Electrical Installation** chapter. Set alarms required and set relays to be activated by these alarms. See **AL 1** etc. functions and **rL 1** etc. functions. Relay 1 is dedicated for use as the DWP relay.

5. Wire in the required digital inputs for Lift and Return or Run and Direction and any digital inputs which are required for your particular crane/hoist.

6. In the **I.NPE** section set the required decimal point for the display, set the mV/V range to suit the load cell used and calibrate or scale the display using either the **CAL 1** and **CAL2** live input method of calibration or scale the display using the **E.CAL**, **E.SCL** and **2ErO** functions. **CAL 1** and **CAL2** can also be undertaken via the **Calibrate** section in the **Advanced** window in the software.

To allow access to the **Advanced** window hold the "Ctrl" key of the keyboard pressed whilst going to **Settings** > **Enable Advanced Mode**. The **E Cal**, **E Scale** and **Set Zero** operations can also be alternatively set in the Window software under **LD5** > **Input Config** but it is also necessary to have the **Advanced** menu visible to enter values for **E Cal** and **E Scale**, otherwise they will be grayed out.

7. In the Windows software go **LD5** > **DWP Config** menu and when ready for commissioning select the **Crane Class** and **Hoist Class**. Enter the **Log Threshold** i.e. the value load percentage above which a log record will be stored. Enter the **Commissioned** date.

1.1 Lockout timer

The **LD5** > **DWP Config** window allows the date and time of commissioning to be entered under **Commissioned** once a date and time has been entered the user has 1 hour of **DWP Hoist Hours** to change any of the settings. After this time the class settings will be locked. If time to test the system is required do not enter the date until ready to commence operations.

1.2 Relay 1 override

Relay 1 is dedicated for use as the DWP relay and will open when any of the DWP parameters such as overloads is exceeded.

To allow loading in progress to be completed once the Relay 1 is open the relay can be overridden a maximum of 5 times of 1 hour run time duration each. To override the relay (i.e. make the relay close) press and hold the **P** button until the relay closes. The hoist will be operational again for 1 hour run time. After 5 such override operations the relay cannot be overridden further.

1.3 Setting alarms

Up to 8 alarms can be set via the **CONF AL Cnt** function. To set an alarm go to the required alarm and set the required operation then choose a relay to activate from that alarm. For example to set alarm 1 to activate at a value above 800 go to the **CONF AL Cnt** function and ensure at least 1 alarm has been selected. At the **AL 1** section press **F** to enter the alarm 1 menu. At the **Hi gh** function press **F** if the previous setting was **OFF** the OFF message will flash, if the previous setting was a number then the right hand digit of the number will flash. Use the **▲** or **▼** pushbutton to select the required value of **800** the press **F** to accept this value.

Alternatively these functions can all be set in the Windows software under **LD5** > **Alarms**.

1.4 Selecting and altering access levels

Access levels can be used to obtain easy access to functions which are regularly required and to limit access to functions which are not required or which restricted access is required. These access level settings can be ignored if no restrictions to access are required and no easy access to selected functions is required.

Changes can be made to these setting via the Windows software - refer to the **Window Software Introduction** section for further details of changing the settings.
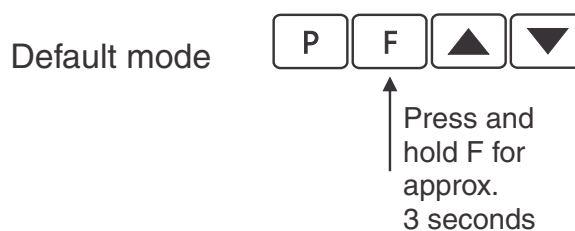
1.5 Accessing setup functions

There are five different ways of accessing setup functions, these are configured via the Windows software under **LD5** > **Function Access**. Each mode allows a selection of access levels for setup functions i.e. allows some choice of which functions are accessible on the 7 segment display via the instruments pushbuttons and via the Windows software. See the **Windows Software Introduction** section in this manual for further details.

As as summary the methods available are:

- **Default mode** - this is the easiest access mode simply requiring the **F** button to be pressed for 3 seconds. This mode would normally be used to gain access to functions which require frequent adjustment.

- **Remote mode** - this uses the Default method of access but also requires the use of a remote input switch.

- **User 1 mode** - this method allows a PIN to be set with access via PIN entry.

- **User 2 mode** - this method also requires a PIN and would generally be use to allow a higher access level than the first PIN.

- **Super Cal mode** - this method requires a power up procedure and will allow access to all functions.

These modes are explained in more detail below.

- **Default mode** - Allows access to the level set at the **Default** window in the PC software menu under **LD5** > **Function Access**. If set to **NONE** level meaning Default mode access is disabled. When using pushbuttons to access functions the accessing the Default mode functions simply requires that the **F** button is held pressed until the message **FUNC** is seen followed by the first function message, this should take approximately 3 seconds. If the message **FUNC End** or no response is seen at this point it means that the access level has been set to **None**.

- **Remote mode** - Allows access to the level set by the **Access Level** section next to **Remote** in the Windows software menu under **LD5** > **Function Access**. For example if the Remote access is set to **CAL** level then access to all setup functions will be allowed when the selected remote input is closed. To select a remote input to be used go to the required remote input function e.g. **r.I n.2** for remote input 2 and set it to **ACCS**, the selected remote input is must also be activated i.e. shorted to GND for this access level to be granted. Alternatively choose **Access** at the required remote input viewed in the Windows software under **LD5** > **Remote Inputs**.
  The default access for this method is **None** so the access level will need to be changed if access via this method is required.

Remote mode

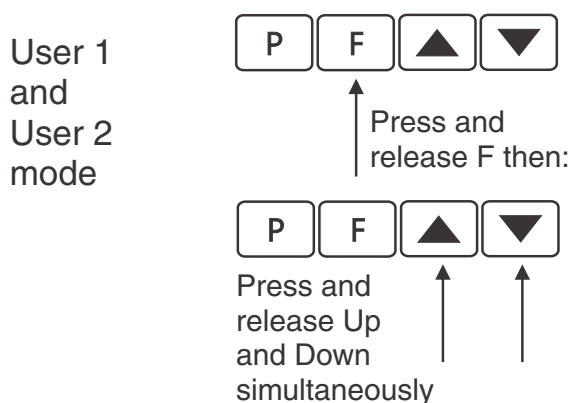| P | F | ▲ | ▼ |

Press and
hold F for
approx.
3 seconds
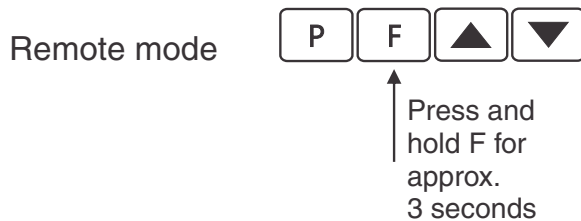
Also requires that the selected
remote input is set to Access
and is activated.

- **User 1 mode** - Allows access to the level set by the **Access Level** section **User 1** window in the Windows software menu under **LD5** > **Function Access**.
  The User 1 mode requires the **F** button is pressed and released then within 2 seconds press the **▲** and **▼** buttons at the same time. The PIN can be set via the **User 1 Pin Code** window. A setting of 0 disables the PIN which means that there is no need to enter the PIN. If the setting is a number other than **nonE** then the first function seen when entering via PIN 1 mode will be the function **CodE**. When this function is seen the PIN value set at the User 1 Pin Code window must be entered via the **▲** or **▼** pushbuttons followed by pressing **F** to accept the PIN before the user can progress to the setup functions.
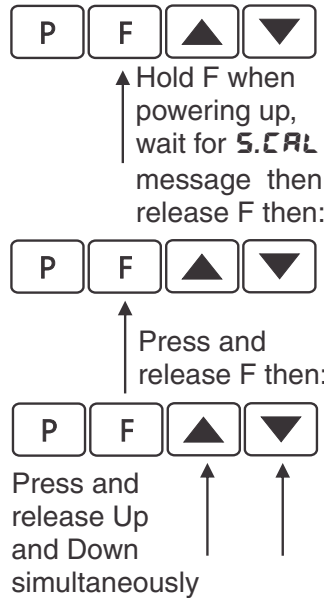
An incorrect code will result in the **FunC End** message being seen indicating that access to setup functions has been refused and the display will return to normal measurement mode.

User 1
and
User 2
mode

| P | F | ▲ | ▼ |

Press and
release F then:

| P | F | ▲ | ▼ |

Press and
release Up
and Down
simultaneously

If a PIN has been set the
message **CodE** will be seen
on the 7 segment display.
Use **▲** or **▼** to enter the PIN
then press **F** to accept the PIN.

- **User 2 mode** - Allows access to the level set by the **Access Level** section **User 2** window in the Windows software menu under **LD5** > **Function Access**.
  This method uses the same access method as User 1 mode above.

- **Super Cal mode** - This method can be used to gain access to all functions. To access via Super Cal mode with the instrument switched off hold in the **F** button whilst the instrument powers up. Keep the button pressed until the **S.CAL** message is seen, you can then release the **F** button. Next press and release **F** then within 2 seconds press and release the **▲** and **▼** pushbuttons simultaneously.
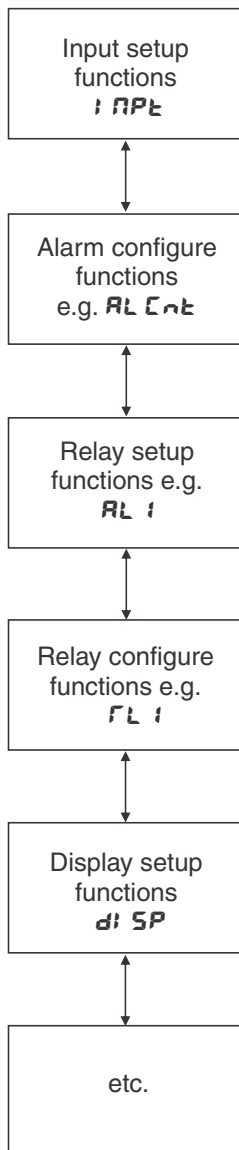
Super Cal
mode

| P | F | ▲ | ▼ |

↑ Hold F when
powering up,
wait for **5.CAL**
message then
release F then:

| P | F | ▲ | ▼ |

↑ Press and
release F then:

| P | F | ▲ | ▼ |

Press and
release Up
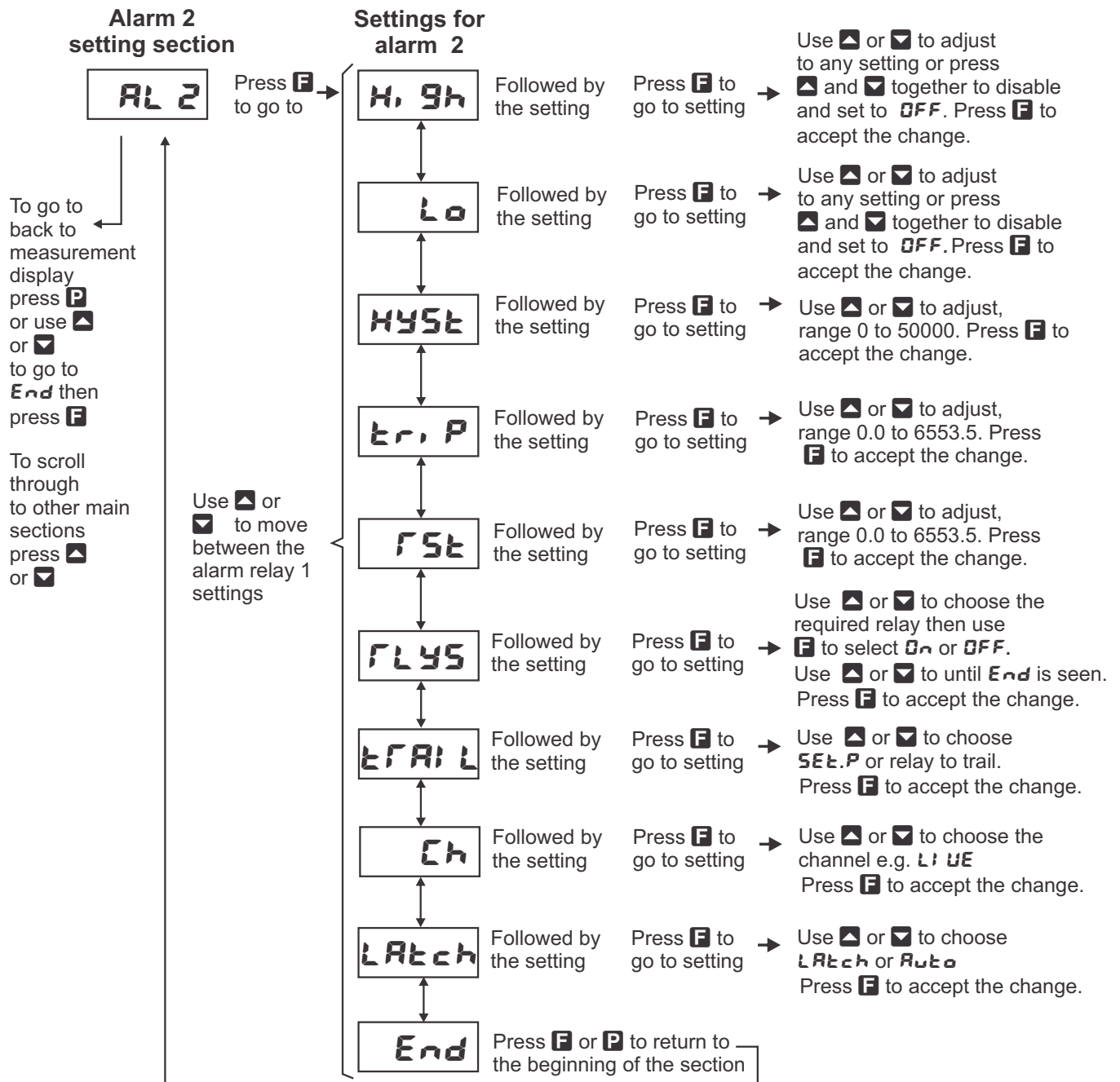and Down
simultaneously   ↑   ↑

The setup functions are organised in blocks or sections e.g. all the settings for channel 1 alarms are in the **AL 1** section. Once access to setup functions has been gained use the ▲ and ▼ buttons to select the section required then press **F** to enter this section and again us the ▲ and ▼ buttons to select the required function for alteration and press **F** to allow alteration of this function.

Typical sections for a basic instrument are illustrated below. In any particular instrument additional sections may appear depending on the part number and any optional outputs fitted.

```
                              ┌──────────────────┐
                              │   Input setup    │
                              │   functions      │
                              │     InPt         │
                              └──────────────────┘
                                       ↕
                              ┌──────────────────┐
                              │  Alarm configure │
                              │    functions     │
                              │   e.g. AL Cnt    │
                              └──────────────────┘
                                       ↕
  Use ▲ or ▼ to move to       ┌──────────────────┐
  the section required then    │   Relay setup    │
  press F to access the        │  functions e.g.  │
  functions in that section.   │      AL 1        │
  Press P to escape the        └──────────────────┘
  section you are in or                 ↕
  press F at the End           ┌──────────────────┐
  function in the section.     │ Relay configure  │
                               │  functions e.g.  │
                               │      rL 1        │
                               └──────────────────┘
                                       ↕
                              ┌──────────────────┐
                              │  Display setup   │
                              │    functions     │
                              │     di SP        │
                              └──────────────────┘
                                       ↕
                              ┌──────────────────┐
                              │                  │
                              │      etc.        │
                              │                  │
                              └──────────────────┘
```

The example in the flowchart (for 4 digit display) below shows the method using alarm relay 1 setup function.

Alarm 2 setting section

```
AL 2
```

Press **F** to go to →

To go to back to measurement display press **P** or use **▲** or **▼** to go to **End** then press **F**

To scroll through to other main sections press **▲** or **▼**

Use **▲** or **▼** to move between the alarm relay 1 settings

Settings for alarm 2

```
H, 9h
```
Followed by the setting | Press **F** to go to setting → Use **▲** or **▼** to adjust to any setting or press **▲** and **▼** together to disable and set to **OFF**. Press **F** to accept the change.

```
Lo
```
Followed by the setting | Press **F** to go to setting → Use **▲** or **▼** to adjust to any setting or press **▲** and **▼** together to disable and set to **OFF**. Press **F** to accept the change.

```
HYSt
```
Followed by the setting | Press **F** to go to setting → Use **▲** or **▼** to adjust, range 0 to 50000. Press **F** to accept the change.

```
tr, P
```
Followed by the setting | Press **F** to go to setting → Use **▲** or **▼** to adjust, range 0.0 to 6553.5. Press **F** to accept the change.

```
rSt
```
Followed by the setting | Press **F** to go to setting → Use **▲** or **▼** to adjust, range 0.0 to 6553.5. Press **F** to accept the change.

```
rLYS
```
Followed by the setting | Press **F** to go to setting → Use **▲** or **▼** to choose the required relay then use **F** to select **On** or **OFF**. Use **▲** or **▼** to until **End** is seen. Press **F** to accept the change.

```
trAI L
```
Followed by the setting | Press **F** to go to setting → Use **▲** or **▼** to choose **SEt.P** or relay to trail. Press **F** to accept the change.

```
Ch
```
Followed by the setting | Press **F** to go to setting → Use **▲** or **▼** to choose the channel e.g. **LI UE** Press **F** to accept the change.

```
LAtch
```
Followed by the setting | Press **F** to go to setting → Use **▲** or **▼** to choose **LAtch** or **Auto** Press **F** to accept the change.

```
End
```
Press **F** or **P** to return to the beginning of the section

2 Mechanical installation

2.1 20mm, 38mm, 45mm, 57mm and 58mm LED

An optional panel mount kit is available for these size displays. Panel cut out size is 240 x 130mm (-0.0mm / +0.5mm). Weight: All types 1.6kg approx.
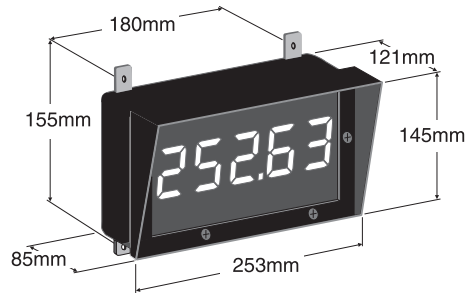
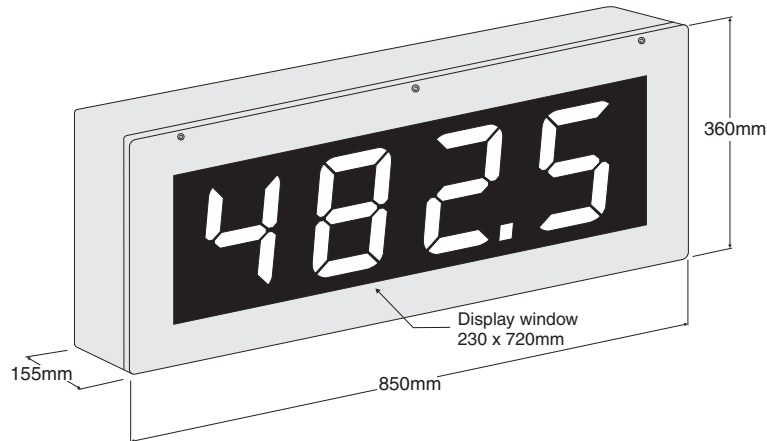## 2.2 100mm 4 digit LED

Weight 10kg (LED)
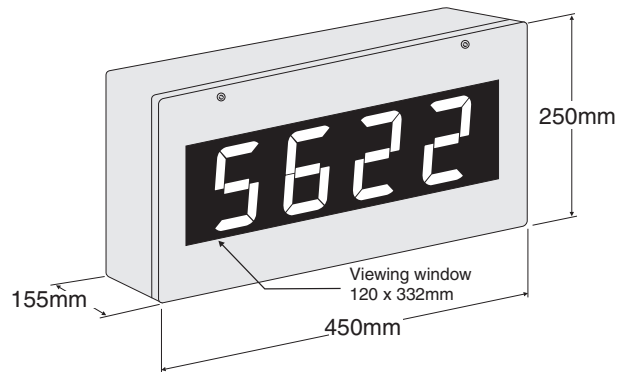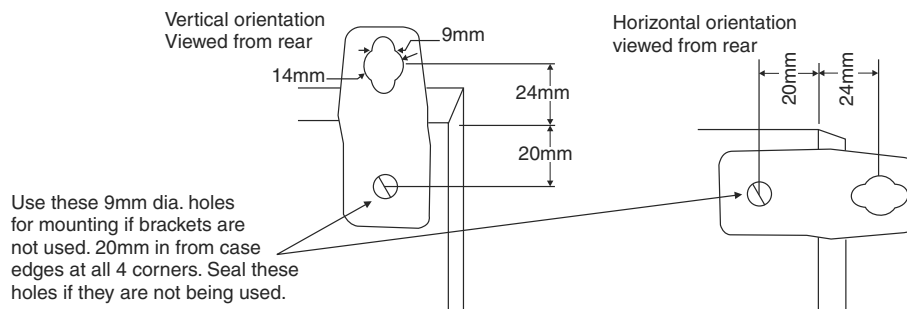

2.3 100mm 6 digit LED

Weight 14kg (LED)

2.4 200mm 4 digit LED

Weight 14kg.

Display window
230 x 720mm

360mm

155mm

850mm
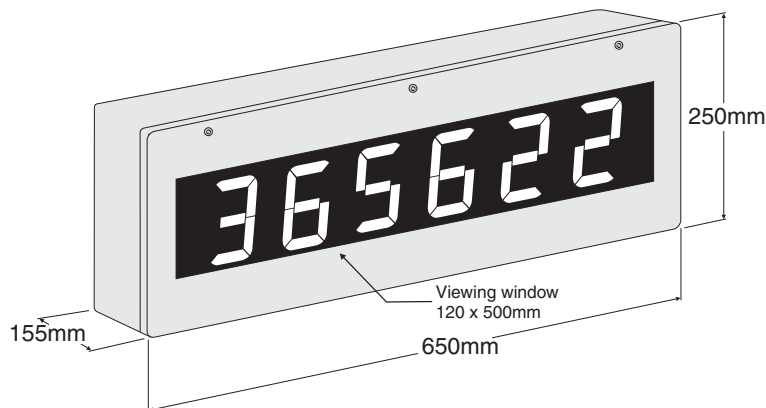
2.5 Cable entry and Mounting brackets

For 20 to 58mm displays no holes are pre drilled. For all 100mm and 200mm displays 3 off 20mm holes are drilled at the bottom of the case, these are fitted with 2 x IP65 grommets and 1 x air vent which allows moisture to exit the case but not enter. Four mounting brackets and four blind grommets are supplied for use with all metal case large digit displays. Diagrams below illustrate vertical and horizontal installation for mounting brackets. If mounting without the brackets is preferred then the 9mm dia. case holes provided for the brackets can be used as alternative mounting holes. Any rear holes not used for mounting should be sealed.

Vertical orientation
Viewed from rear

9mm

14mm

24mm

20mm

Use these 9mm dia. holes
for mounting if brackets are
not used. 20mm in from case
edges at all 4 corners. Seal these
holes if they are not being used.

Horizontal orientation
viewed from rear

20mm

24mm

3 Electrical Installation

The display is designed for continuous operation and therefore no mains/power switch is fitted to the unit. It is recommended that an external switch and fuse be provided to allow the unit to be removed for servicing. To install cables in 20, 38, 45, 57 or 58mm displays remove six front panel retaining screws then remove front panel taking care not to damage the ribbon cable (ribbon cable joins the front display circuit board to the main circuit board). For 100 and 200mm displays loosen the front retaining screws and open the lid. Connect power and input cables to the plug in terminal blocks located within the enclosure. The terminals are clearly labeled and unplug for ease of installation, please take care to connect them correctly. The terminal blocks allow for wires of up to 2.5mm^2 to be fitted (relays and power) and 1.5mm^2 for remote inputs. When power is applied the instrument will cycle through a display sequence, indicating the software version and other status information, this indicates that the instrument is functioning.

See the "LD5/LE5 Series Large Digit Display Output Addendum" booklet for wiring details of any optional outputs not covered in this instruction manual.

Input board layout
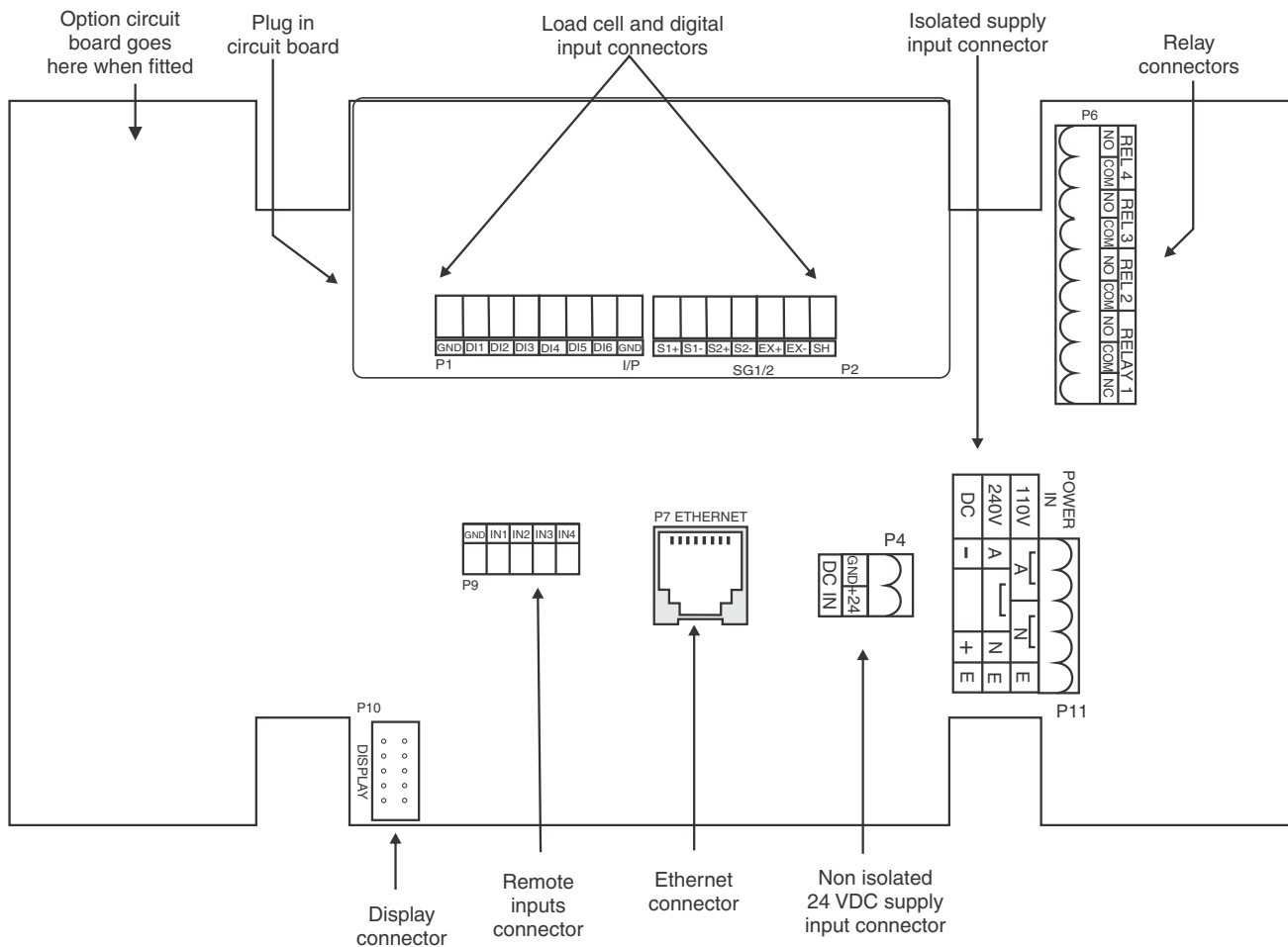
3.1 Power supply connections

The power supply for the instrument is factory fitted and is of a fixed type. Check power supply type before connecting. Non isolated 24VDC supply instruments use the DC IN connector P4 shown on the diagram above. AC supply and isolated DC supply instruments use connector P11.

3.2 AC supply or isolated DC supply - for displays digits less than 100mm

Supply connections for 240 VAC

POWER IN				P11
110V	A	N		E
240V	A		N	E
DC	–		+	E

Plug in connector

Plug in after wiring

Wire link

A   N E

240 VAC when transformer is fitted

Supply connections for 110 VAC

POWER IN				
110V	A	N		E
240V	A		N	E
DC	–		+	E

Plug in connector

Plug in after wiring

Wire links

A   N E

110 VAC when transformer is fitted

Supply connections for isolated DC and low voltage AC

POWER IN				
110V	A	N		E
240V	A		N	E
DC	–		+	E

Plug in connector

Plug in after wiring

–   + E

12 to 48 VDC or 24 to 48 VAC. The DC and low voltage AC require the isolated supply pcb to be fitted. (Example above shows polarity for DC input, 24 to 48 VAC input uses the same terminals (not polarised))

3.3 Non isolated DC supply - for displays digits less than 100mm

24VDC ±10% non isolated DC supply connections.

Non isolated 24 VDC supply

Plug in connector

P4

DC IN   GND +24V

–

+

Plug in after wiring
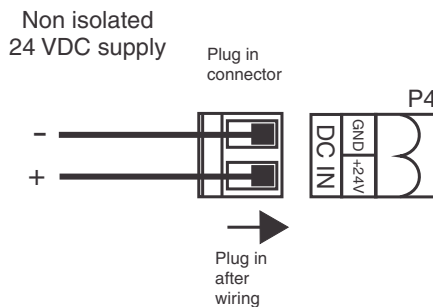
3.4 100mm and 200mm display power supplies

Optional isolated DC supply - 100mm and 200mm displays

Isolated DC supplies (12 to 24VDC) connect to the isolated supply pcb on the base board. AC supplies connect to the transformer primary on the base board inside the case. Supply type is factory configured.

Optional isolated dc board
(for use with 100mm & 200mm led
displays and 100mm
electromagnetic displays only)

E | + IN –

Input DC 12-24V   CASE + -
EARTH

+ –

Output DC to
display board
+ -
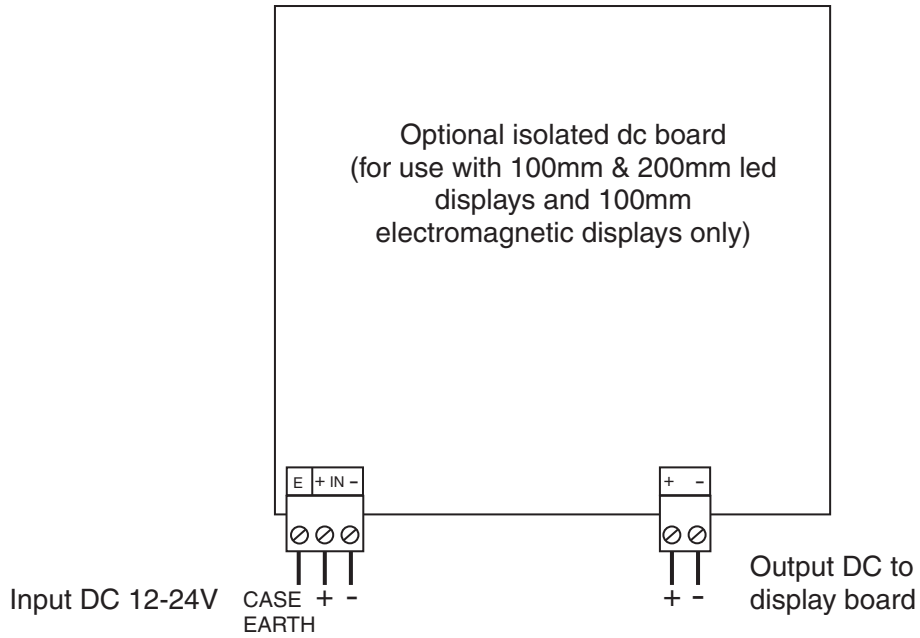
AC supplies - 100mm and 200mm displays. AC supplies connect to the transformer primary on the base board inside the case. Supply type is factory configured.

240 & 110VAC supplies.
For 100mm/200mm LED or 100mm electromagnetic display types only.
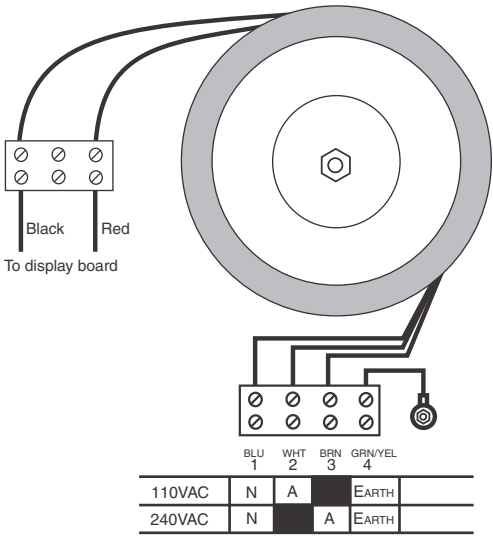
Low voltage AC supplies.
For 100mm/200mm LED or 100mm electromagnetic display types only.

Black   Red

To display board

Black   Red

To display board

	BLU 1	WHT 2	BRN 3	GRN/YEL 4
110VAC	N	A		EARTH
240VAC	N		A	EARTH

	BRN 1	RED 2	ORG 3	BLK 4	GRY 5	WHT 6	GRN/YEL 7
48VAC	A		LINK			N	
42VAC	A		LINK			N	
32/36VAC	A		LINK			N	
24VAC	A	LINK			LINK	N	EARTH
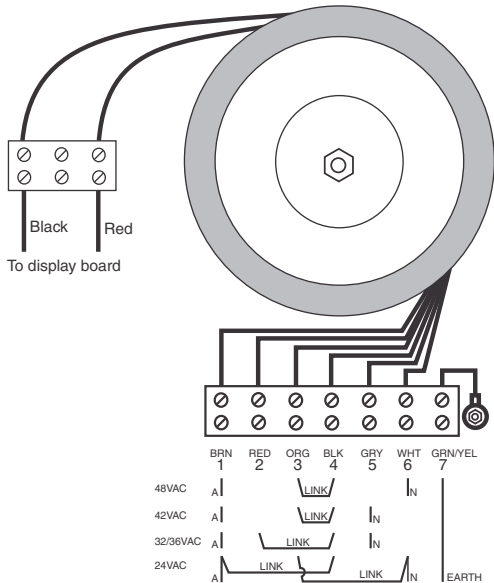
Wiring examples 240VAC & 110VAC
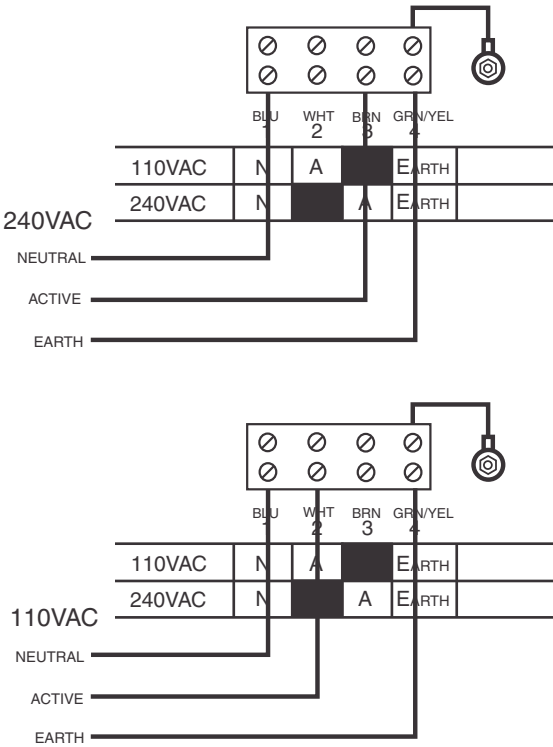
Wiring examples low voltage AC

	BLU 1	WHT 2	BRN 3	GRN/YEL 4
110VAC	N	A		EARTH
240VAC	N		A	EARTH

240VAC
NEUTRAL
ACTIVE
EARTH

48VAC

BRN 1   RED 2   ORG 3   BLK 4   GRY 5   WHT 6   GRN/YEL 7
LINK

ACTIVE
NEUTRAL
EARTH

	BLU 1	WHT 2	BRN 3	GRN/YEL 4
110VAC	N	A		EARTH
240VAC	N		A	EARTH

110VAC
NEUTRAL
ACTIVE
EARTH

42VAC

BRN 1   RED 2   ORG 3   BLK 4   GRY 5   WHT 6   GRN/YEL 7
LINK

ACTIVE
NEUTRAL
EARTH

32 TO
36VAC

BRN 1   RED 2   ORG 3   BLK 4   GRY 5   WHT 6   GRN/YEL 7
LINK

ACTIVE
NEUTRAL
EARTH

Important note: the 240V & 110V supplies use the same transformer, low voltage instruments use a different transformer. Do not use a low voltage transformer for 240V or 110V or vice versa.

24VAC

BRN 1   RED 2   ORG 3   BLK 4   GRY 5   WHT 6   GRN/YEL 7
LINK   LINK

ACTIVE
NEUTRAL
EARTH

3.5   Load cell inputs

The input board and 4 wire and 1 x 6 wire connection details are shown below.

Digital input terminals

mV/V input terminals
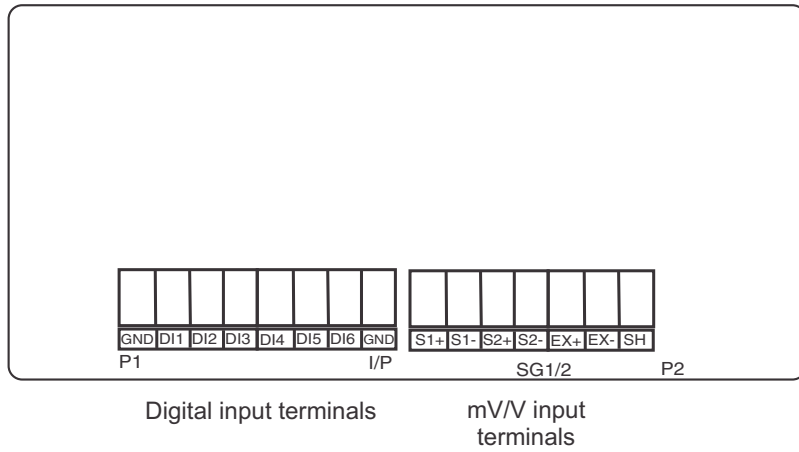
4 wire load cell connection
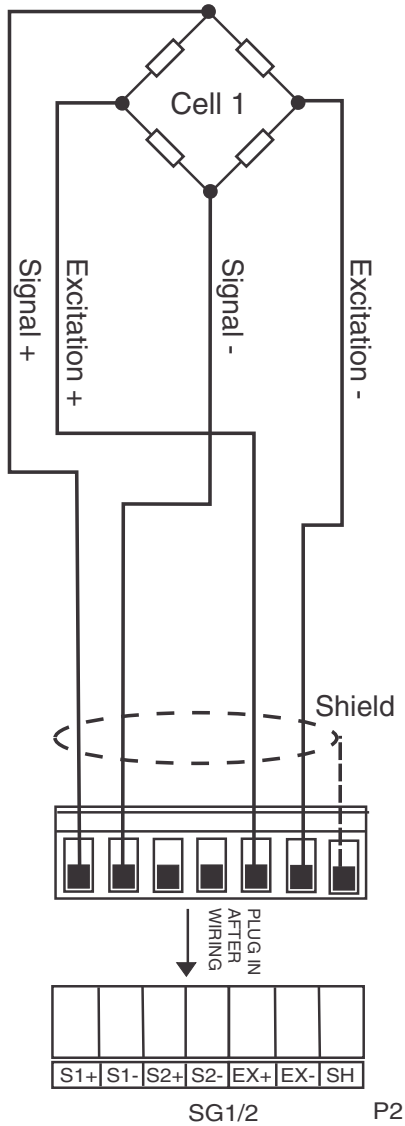
6 wire load cell connection
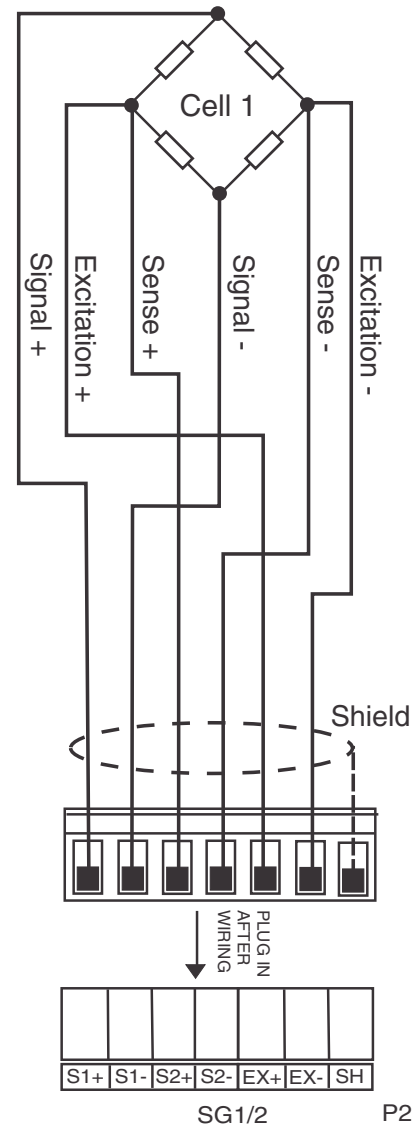
3.5.1 Ethernet

The Ethernet connection is via the RJ45 connector P7 on the main board.

3.5.2 Non isolated RS485

The non isolated RS485 connections are on connector P12 at the bottom of the main board. This port is for use downloading program updates only.
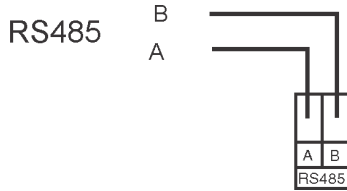
RS485

For RS485 the A terminal connects to other A terminal and the B terminal connects to other B terminals. Use twisted pair shielded cable for RS485.

3.5.3 Digital inputs

The digital inputs are situated on the input circuit board. Wiring example showing voltage free contacts below. The inputs have 5VDC on each input and can be configured for active high or active low operation via the PC software. The digital inputs operations are as follows:

Input DI1 - can be configured as a **Lift** or **Run** input via PC software e.g. when configured as a **Lift** input a short circuit between D11 and GND indicates a lift is underway (if the input level is set to **Lo** in the PC software)
Input DI2 - operates as a **Return** input when DI1 is set to **Lift** or a **Dir** (direction) input when DI1 is set to **Run**
Input DI3 - **North** travel input
Input DI4 - **South** travel input
Input DI5 - **East** travel input
Input DI6 - **West** travel input

Digital input connector. With input active LED indicators.

Plug in after wiring

Latching or momentary voltage free switches or 0-5VDC control signal. Can be set for active high or low operation.
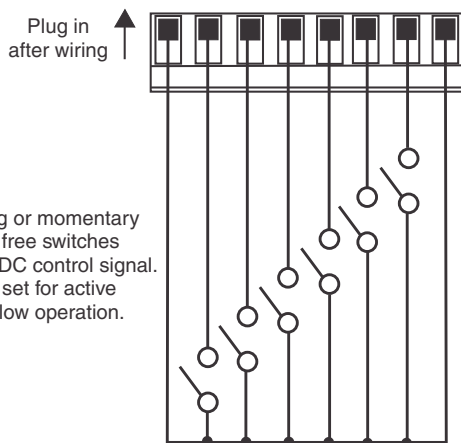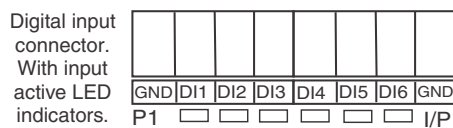
3.5.4 Remote inputs

The remote inputs situated on the main circuit board. The operation mode of the remote inputs are controlled by separate functions for each input configurable via the display pushbuttons (see the r.i nP section functions) or via the PC software under **LD5** > **LSR Remote Inputs**. The electrical configuration for these inputs is configured by **Digital Inputs** section in the PC software under Found under **LD5** > **LSR Digital Inputs**. For example with the **Active Level** set to **Low** and the **Pull Up/Down** set to **High** a short circuit between the remote input and GND will activate the remote input. If the **Active Level** is now set to **High** an open circuit will activate the remote input. Wiring example showing voltage free contacts below.
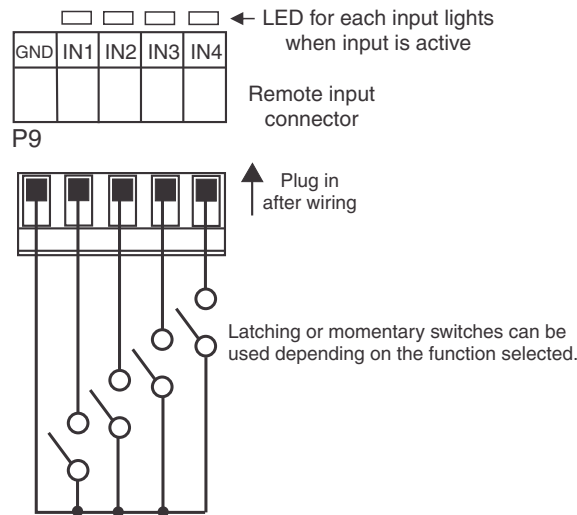
3.5.5 Relays 1 to 4

Relay 1 is dedicated to remain closed between COM and N/O terminals whilst the measured parameters such as overloads etc. are within the DWP spec. Once one of these parameters is exceeded the relay will de activate. This allows the relay to be used to prevent lifts when the DWP is exceeded if wired appropriately. If Relay 1 de activates mid lift then the relay can be forced to close for 1 hour by pressing the **P** button. The override can be undertaken a maximum of 5 times after which the relay cannot be forced to close.

Relays 1 to 4 are rated at 240VAC 5A into a resistive road. Relay 1 is form C type. Relays 2,3 and 4 are form A type. These relays are fitted onto the main board when supplied. See the "LD5 Series 8 Channel Scanning Monitor Output Addendum" for wiring details of optional relays 5 to 8.
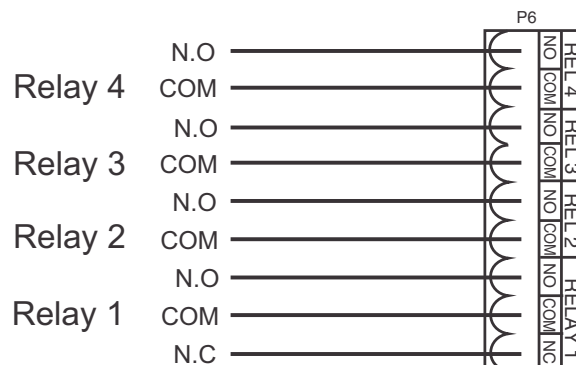
4 Function tables - summary of setup functions

Note: the order in which the functions appear on the display may not be exactly as shown below. The availability and order of functions is determined by choice of function settings and options fitted.

Functions in these tables may be accessed by the instruments push buttons and some of these functions can be accessed via the PC software. Functions not shown in the tables below must be accessed via the PC software.

4.1 Input function table ı ∩Pє

Display	Function	Range	Default	Your record	Ref/Page
d.Pnє	Display decimal point	0, 0. 1, 0.02, 0.003	0		5.1 / 24
d.rnd	Display rounding	1 to 5000	1		5.2 / 24
FLєr	Digital filter	0, 1, 2, 3, 4, 5, 6, 7, 8	3		5.3 / 25
ı ∩Pє	mV/V input range	40, 20, 10, 5, 2.5, 1.2, 0.6, 0.3 mV/V	10		5.4 / 25
ı .єyP	4 or 6 wire load cell	4LC, 6LC	10		5.5 / 26
E.Ouє	Excitation voltage selection	5, 10 V	10		5.6 / 26
Lo dı SP	Low overrange visual warning limit value	Any display value or OFF	OFF		5.7 / 26
Hı dı SP	High overrange visual warning limit value	Any display value or OFF	OFF		5.8 / 27
dı SP	Display visual warning flashing mode	NONE, FLSH, - - - -, Or.Ur, HI .LO	NONE		5.9 / 27
U.CRL	Uncalibrate	n/a	n/a		5.10 / 27
CRL 1	First calibration input	n/a	n/a		5.11 / 28
CRL2	Second calibration input	n/a	n/a		5.12 / 28
E.CRL	mV/V input scaling method	n/a	n/a		5.13 / 28
E.SCL	mV/V input scaling method - scale value	Any display value	n/a		5.14 / 29
2Ero	Zero input	n/a	n/a		5.15 / 29
2Ero rN9E	Zero limit	0 to 1000 or OFF	0		5.16 / 30
2Ero PNє	Zero limit memory reset	n/a	n/a		5.17 / 30

4.2   Alarm configuration function table `COnF`

Display	Function	Range	Default	Your record	Ref/Page
`AL` `Cnt`	Alarm number selection	`0`, `1`, `2`, `3`, `4`, `5`, `6`, `7`, `8`	`2`		5.18 / 31
`dFLt` `di SP`	Default display	`LI UE`, `H.USE`, `C.USE`, `O.LdS`, `LoAd`	`LI UE`		5.19 / 31

4.3   Alarm relay function table `AL 1` to `AL 8`

Display	Function	Range	Default	Your record	Ref/Page
`Hi gh`	High setpoint value for designated alarm relay	Any display value or `OFF`	`OFF`	See 4.8	5.20 / 31
`Lo`	Low setpoint value for designated alarm relay.	Any display value or `OFF`	`OFF`	See 4.8	5.21 / 32
`HYSt`	Alarm relay hysteresis (deadband)	`0` to `6553.5`	`1.0`	See 4.8	5.22 / 33
`tri P`	Trip time delay for the designated alarm relay	`0` to `6553.5` secs	`0.0`	See 4.8	5.23 / 34
`rSt`	Reset time delay for the designated alarm relay	`0` to `6553.5` secs	`0.0`	See 4.8	5.24 / 34
`rLYS`	Relay selection `On` or `OFF`	`On` or `OFF`	`OFF`	See 4.8	5.25 / 35
`trL`	Alarm trailing or setpoint mode	`SEt.P`, `tL 1`, `tL 2`, `tL 3`, `tL 4`, `tL 5`, `tL 6`, `tL 7`	`SEt.P`	See 4.8	5.26 / 35
`Ch`	Alarm relay operation input selection	`Li uE`, `LoAd`	`Li uE`	See 4.8	5.27 / 36
`Ltch`	Alarm relay latching operation	`Auto`, `Ltch`, `A.b`, `L.b`	`Auto`	See 4.8	5.28 / 36

4.4   Relay configure function table `rL 1` to `rL 8`

Display	Function	Range	Default	Your record	Ref/Page
`rLY`	Alarm relay *x* action to normally open (de-energised) or normally closed (energised)	`n.o`, `n.c`	`n.o`	See 4.8	5.29 / 36
`AcK`	Relay acknowledge	`OFF` or `On`	`OFF`	See 4.8	5.30 / 37

bool	Alarm relay Boolean logic operation	**Or**, **And**	**Or**	See 4.8	5.31 / 37

4.5 Option board excitation voltage function table **E.OuE**

Display	Function	Range	Default	Your record	Ref/Page
E.OuE OuEP	Voltage out - option boards	**5 U**, **I2U**	**5 U**		5.32 / 38

(*__Optional__)—this function will only be accessible if the relevant option is fitted

4.6 Display function table **dI 5P**

Display	Function	Range	Default	Your record	Ref/Page
br 9E Auto	Automatic display brightness	**OFF** or **On**	**On**		5.33 / 38
br 9E	Display brightness	**I** to **64**	**63**		5.34 / 38
duI I	Dimmed display brightness	**0** to **63**	**7**		5.35 / 39
Auto HI 9h	Auto display brightness high level	**I6** to **64**	**63**		5.36 / 39
Auto Lo	Auto display brightness low level	**I** to **64**	**7**		5.37 / 39

4.7 Remote input and 🅿 button function table **r.I nP**

Display	Function	Range	Default	Your record	Ref/Page
P.buE	Front P button operation mode	**nOnE, P.HI, P.Lo, HI.Lo, AL.Ac, 2Ero**	**nOnE**		5.38 / 40
r.I n. I	Remote input 1 operation mode	**nOnE, P.HI d, d.HI d, P.HI, P.Lo, HI.Lo, AL.Ac, ACC5, P.buE, F.buE, U.buE, d.buE, duI I, 2Ero**	**nOnE**		5.39 / 40

⌐.I Π.2	Remote input 2 operation mode	NONE, P.HI d, d.HI d, P.HI , P.Lo, HI .Lo, AL.Ac, ACCS, P.but, F.but, U.but, d.but, dwI I , ZEro	NONE		5.40 / 41
⌐.I Π.3	Remote input 3 operation mode	NONE, P.HI d, d.HI d, P.HI , P.Lo, HI .Lo, AL.Ac, ACCS, P.but, F.but, U.but, d.but, dwI I , ZEro	NONE		5.41 / 42
⌐.I Π.4	Remote input 4 operation mode	NONE, P.HI d, d.HI d, P.HI , P.Lo, HI .Lo, AL.Ac, ACCS, P.but, F.but, U.but, d.but, dwI I , ZEro	NONE		5.42 / 42

4.8 Relay tables

Record your relay settings in the table below

Note: 4 relays are provided as standard - 4 extra relays are optionally available

Record your relay settings in the table below

Display	Alarm 1	Alarm 2	Alarm 3	Alarm 4	Alarm 5	Alarm 6	Alarm 7	Alarm 8
H, 9h								
Lo								
HYSt								
tr, P								
rSt								
rLYS								
trL								
Ch								
Ltch								

Record which relays are allocated to which alarms and other relay settings in the table below

Display	Relay 1	Relay 2	Relay 3	Relay 4	Relay 5	Relay 6	Relay 7	Relay 8
Alarm 1								
Alarm 2								
Alarm 3								
Alarm 4								
Alarm 5								
Alarm 6								
Alarm 7								
Alarm 8								
rLY								
Ackh								
bool								

5 Explanation of functions

The setup and calibration functions are configured through a push button sequence. The three push buttons located at the front of the instrument are used to alter settings. The access modes available

Explanation of Functions

5.1 Display decimal point

Section:	ı ŋPŁ
Display:	d.PnŁ
Range:	0, 0. 1, 0.02, 0.003
Default Value:	0
Default Access Level	7
Function number	4 100

Displays and sets the decimal point. By pressing the ▲ or ▼ pushbutton at the this function the decimal point position may be set. The display will indicate as follows: **0** (no decimal point), **0. 1** (1 decimal place), **0.02** (2 decimal places) or **0.003** (3 decimal places) Note if the decimal point is altered the display will need to be recalibrated and alarm etc. settings checked.

To change the setting press **F** at the **d.PnŁ** display then use the ▲ or ▼ pushbutton to toggle to required setting then press the **F** button again to confirm the selection.

5.2 Display rounding

Section:	ı ŋPŁ
Display:	d.rnd
Range:	1 to 5000
Default Value:	1
Default Access Level	4
Function number	4360

Displays and sets the display rounding value. This value may be set to 1 - 5000 displayed units. Display rounding is useful for reducing the instrument resolution without loss of accuracy in applications where it is undesirable to display to a fine tolerance. To set the display rounding value go to the function and use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection. Example: If set to **10** the display values will change in multiples of 10 only i.e. display moves from **10** to **20** to **30** etc.

To change the setting press **F** at the **d.rnd** display then use the ▲ or ▼ pushbutton to toggle to required setting then press the **F** button again to confirm the selection.

5.3 Digital filter

Section:	*I NPE*
Display:	*FLEr*
Range:	*0*, *1*, *2*, *3*, *4*, *5*, *6*, *7*, *8*
Default Value:	*3*
Default Access Level	4
Function number	*43C0*

Displays and sets the digital filter value. Digital filtering uses a weighted average method of determining the display value and is used for reducing display value variation due to short term interference. The digital filter range is selectable from *0* to *8*, where *0* = none and *8* = most filtering. Use ▲ or ▼ at the *FLEr* function to alter the filter level if required. Note that the higher the filter setting the longer the display may take to reach its final value when the input is changed, similarly the relay operation and any output options will be slowed down when the filter setting is increased. To set the digital filter value go to the *FLEr* function and use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection.

5.4 mV/V input range

Section:	*I NPE*
Display:	*I NPE*
Range:	*40*, *20*, *10*, *5*, *2.5*, *1.2*, *0.6*, *0.3* mV/V
Default Value:	*10*
Default Access Level	7
Function number	*46O1*

Displays and sets the mV/V (milli Volt output per Volt of excitation) range to suit the transducer useable range. For example a transducer with 2mV/V output will have a theoretical output from 0mV at no load to 20mV at full specified load if 10V excitation is used. Check the transducer label or transducer calibration sheet or brochure for mV/V specification. Choose the value equal to or the next higher value to the mV/V output of the transducer. This selection sets the input range for the A/D converter. If too low a range is selected a *-Or-* error message may be seen on the display when a load is applied. If too high a range is selected the full resolution capability will not be used and problems with calibration can result.

To change the setting press **F** at the *I NPE* display then use the ▲ or ▼ pushbutton to toggle to required setting then press the **F** button again to confirm the selection.

5.5   4 or 6 wire load cell

Section:	*ı ∩Pᴸ*
Display:	*ı .ᴸყP*
Range:	*ЧᴸC, БᴸC*
Default Value:	*ı0*
Default Access Level	7
Function number	*ЧБ02*

Displays and sets the choice of 4 wire load cell connection (*ЧᴸC*) or 6 wire load cell connection (*БᴸC*). If a 4 wire connection is used do not make any connections to the 6 wire terminals.

To change the setting press **F** at the *ı .ᴸყP* display then use the ▲ or ▼ pushbutton to toggle to required setting then press the **F** button again to confirm the selection.

5.6   Excitation voltage selection

Section:	*ı ∩Pᴸ*
Display:	*E.0ᴜᴸ*
Range:	*5*, *ı0* V
Default Value:	*ı0*
Default Access Level	7
Function number	*ЧБ03*

Displays and sets the choice of excitation voltage for the load cell. This can be set to 5 or 10VDC (*5* or *ı0*). If 5 Volts is used then up to eight 350 Ohm load cells (or down to 42 Ohms input resistance) can be connected in parallel to the input. If 10V is used up to two 350 Ohm load cells (or down to 175 Ohms input resistance) can be connected in parallel to the input. If 15V is used then one 350 Ohm load cell can be connected to the input.

To change the setting press **F** at the *E.0ᴜᴸ* display then use the ▲ or ▼ pushbutton to toggle to required value then press the **F** button again to confirm the selection.

5.7   Low overrange visual warning limit value

Section:	*ı ∩Pᴸ*
Display:	*Lo dı 5P*
Range:	Any display value or *0FF*
Default Value:	*0FF*
Default Access Level	4
Function number	*Ч550*

Low overrange limit value - the display can be set to show an overrange message if the display value falls below the *Lo dı 5P* setting. For example if *Lo dı 5P* is set to *50* then once the display reading falls below *50* the message *⁻or⁻* will flash on and off or the display value will flash on and off instead of the normal display units (see *dı 5P* function). This message can be used to alert operators to the presence of an input which is below the low limit. If this function is not required it should be set to *0FF* by pressing the ▲ and ▼ buttons simultaneously at this function.

5.8   High overrange visual warning limit value

Section:	*I NPE*
Display:	*Hi di SP*
Range:	Any display value or *OFF*
Default Value:	*OFF*
Default Access Level	4
Function number	*4560*

High overrange limit value - the display can be set to show an overrange message if the display value rises above the *Hi di SP* setting. For example if *Hi di SP* is set to *1000* then once the display reading rises above *1000* the message *-or -* will flash on and off or the display value will flash on and off instead of the normal display units (see *di SP*). This message can be used to alert operators to the presence of an input which is above the high limit. If this function is not required it should be set to *OFF* by pressing the ▲ and ▼ buttons simultaneously at this function.

5.9   Display visual warning flashing mode

Section:	*I NPE*
Display:	*di SP*
Range:	*NONE*, *FLSH*, *- - - -*, *OF.UF*, *HI .LO*
Default Value:	*NONE*
Default Access Level	4
Function number	*4570*

Display overrange warning flashing mode - this function is used in conjunction with the *Lo di SP* and *HI gH di SP* functions. The *di SP* function can be set to *FLSH* or *-or -*. If the display warning value set at the *Lo di SP* or *HI gH di SP* function is exceeded and the *di SP* function is set to *FLSH* then the display value will flash on and off every second as a visual warning. If the display warning value set at the *Lo di SP* or *HI gH di SP* function is exceeded and the *di SP* function is set to *-or -* then the *-or -* message will flash on and off once a second as a visual warning. The warning flashes will cease and the normal display value will be seen when the value displayed is higher than the low limit and lower than the high limit.

5.10   Uncalibrate

Section:	*I NPE*
Display:	*U.CAL*
Range:	n/a
Default Value:	n/a
Default Access Level	7
Function number	*0620*

Resets the display live value calibration back to a factory default which is 100 counts per mV/V input. i.e. a 2mV/V input will display 200. This function is useful in that if a calibration has failed resulting in an unstable reading uncalibrating the display will return the display back to a stable reading.

To uncalibrate press **F** at the **U.CAL** display then use the ▲ or ▼ pushbutton to toggle to **YES** then press the **F** button again to confirm uncalibration.

5.11   First calibration input

Section:	**InPt**
Display:	**CAL 1**
Range:	n/a
Default Value:	n/a
Default Access Level	7
Function number	**0b00**

Allows access to the first live input calibration point.

5.12   Second calibration input

Section:	**InPt**
Display:	**CAL2**
Range:	n/a
Default Value:	n/a
Default Access Level	7
Function number	**0b 10**

Allows access to the second live input calibration point.

5.13   mV/V input scaling method

Section:	**InPt**
Display:	**E.CAL**
Range:	n/a
Default Value:	n/a
Default Access Level	7
Function number	**46F0**

This **E.CAL** process offers an alternative scaling method to **CAL 1** and **CAL2** . The **E.CAL** and **E.SCL** functions allows a known mV/V value for the input to be entered at the **E.CAL** function and the capacity at that mV/V in whatever units are required as the **E.SCL** These two values allow a scaling slope to be calculated and once a zero reference is entered at the **ZEro Pnt** function or **Set Zero Point** in the PC software under **LD5** > **Input Config** the scaling is complete. See the "Example:" section below for notes on accessing thes functions using **Advanced** mode in the PC software.

The value is entered to 3 decimal places. The mV/V input range selected at the **InPt** function will remain the input range for the instrument even if the **E.CAL** value used higher or lower.

Example:

This example describes the method used when entering values using the instrument pusbuttons. Alternatively you can enter these values (and click on the **Set Zero Point**) using the PC software under **LD5 > Input Config**. Note that you must be in **Advanced** mode in the PC software to access scaling and calibration functions. To access **Advanced** mode in the PC software you must hold the **Ctrl** key on the keyboard then click on **Settings** then click on **Enable Advanced Mode**. Also if using the PC software ensure that any password required has been entered under **Tools** > **Enter Password** (default password is blank i.e. just click OK in the password window).

Enter function menus in **5.CAL** mode.

Check that the **d.Pnt** and **INPt** functions are set as required.

Step through the functions until the **E.CAL** display is seen.

Press the **F** button, the right hand digit of the mV/V value will flash. Use **▲** or **▼** to alter this value to the mV/V output of the cell being used. Press and release the **F** button to accept the new value.

Press and release the **▲** button, the display will now show **E.SCL** followed by the current scale value or enter the value in the PC window. Press the **F** button, the right hand digit of the scale value will flash. Use **▲** or **▼** to alter this value to the required capacity at the mV/V value set at the **E.SCL** function e.g. could be **5000** for 5000kg. Press and release the **F** button to accept the new value.

Use **▲** to get to the **ZErO** function. Ensure that there is zero load applied (at this point the instrument is sampling the input signal). The display will show **NO**, press the **F** button and the **NO** display will flash. Use **▲** or **▼** push button until **YES** flashes and then press the **F** button. The display will show the message **ZErO LOAd** followed by the current live display value Press then release the **F** button to accept this as the zero input level for the scaling operation.

5.14   mV/V input scaling method - scale value

Section:	**INPt**
Display:	**E.SCL**
Range:	Any display value
Default Value:	n/a
Default Access Level	7
Function number	**4710**

The scale value for the mV/V entry method of scaling can be entered at this function, see the **E.CAL** for further details.

5.15   Zero input

Section:	**INPt**
Display:	**ZErO**
Range:	n/a
Default Value:	n/a
Default Access Level	7
Function number	**0b40**

Allows the current live display of the input to be zeroed.

To zero the display press **F** at the **ZErO** display then use the ▲ or ▼ pushbutton to toggle to **YES** then press the **F** button, the current value will be shown, press the **F** button again to confirm the zero operation.

5.16 Zero limit

Section:	**iNPt**
Display:	**ZErO rN9E**
Range:	**0** to **1000** or **OFF**
Default Value:	**0**
Default Access Level	7
Function number	**4580**

This function sets the limit value for zero operations on this display. It can be used to reduce the risk that too high a value is zeroed from the display. For example if set to **100** then a value of up to 100 is allowed to be zeroed from the display. The value zeroed is stored in memory each time and once the value or the sum of all the values in memory reaches the limit value it will not allow the display to be zeroed and the **ZErO rN9E Err** message will be seen. For example with the limit set to **100** a display value of 20 can be zeroed up to 5 times but beyond the error message will be seen and the display will not zero.

If for any reason it is required to clear the memory of the accumulated zero operations us the **ZErO PNt** function which follows.

5.17 Zero limit memory reset

Section:	**iNPt**
Display:	**ZErO PNt**
Range:	n/a
Default Value:	n/a
Default Access Level	7
Function number	**4580**

This function allows the accumulated memory of zero operations used for the **ZErO rN9E** function to be cleared. See **ZErO rN9E** for further details. Note that using this operation does not affect the live display value it only clears the zero range accumulated total. Note that the **ZErO PNt** memory will also be reset after a 2 point calibration and after a zero operation.

5.18 Alarm number selection

Section:	`COnF`
Display:	`AL Cnt`
Range:	`0`, `1`, `2`, `3`, `4`, `5`, `6`, `7`, `8`
Default Value:	`2`
Default Access Level	4
Function number	`437d`

This function allows selection of the number of alarms required for the instrument. For each alarm high, low etc. parameters can be set and a relay or relays selected to operate from the alarm parameters set.

5.19 Default display

Section:	`COnF`
Display:	`dFLt diSP`
Range:	`LiVE`, `H.USE`, `C.USE`, `O.LdS`, `LoAd`
Default Value:	`LiVE`
Default Access Level	4
Function number	`7038`

Sets the instruments default display. The default display can be set to `LiVE` if the live weigh is required as the default display or to `H.USE` if the hoist hours used is required as the default display or to `C.USE` if crane hours used is required as the default display or to `O.LdS` if the number of overloads is required as the default display or to `LoAd` if the percentage load is required as the default display. The Live display will always show the weight in the units is is calibrated in where the Load display shows the load as a percentage of full load. The default display is the display value shown when the instrument powers up. If the instrument is toggled to an alternative display then it will return to the default display after a period of approximately 20 seconds.

5.20 Alarm relay high setpoint

Section:	`AL 1` to `AL 8`
Display:	`Hi 9h`
Range:	Any display value or `OFF`
Default Value:	`OFF`
Default Access Level	`2`
Function number	`4000` to `4007`

Displays and sets the high setpoint value for the designated alarm relay. Use this high setpoint function if a relay operation is required when the display value becomes equal to or more than the low setpoint value.

To set the high alarm value go to the `Hi 9h` function, press ▣ and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press ▣ to accept this selection. The high alarm setpoint may be disabled by pressing the ▲ and ▼ push buttons simultaneously. When the alarm is disabled the display will indicate `OFF`. If the relay is allocated both a low and high setpoint then the relay will activate when the value displayed moves outside the band set by the low and high setpoints.

The value at which the relay will reset is controlled by the **HYSt** function.

Overlapping alarms - if the **Hi gh** value is set lower than the **Lo** value then the alarm will activate in the band between the two values.

If the display has annunciator leds for the relay then the annunciator will initially flash in alarm condition, if the alarm is acknowledged by pressing the **F** button (where fitted) or has been acknowledged by a **P** button or remote input operation the annunciator will be solidly lit until the display moves out of alarm condition.

Example:
If **Hi gh** under **AL 1** is set to **100** then relay 1 will activate when the display value is **100** or higher.
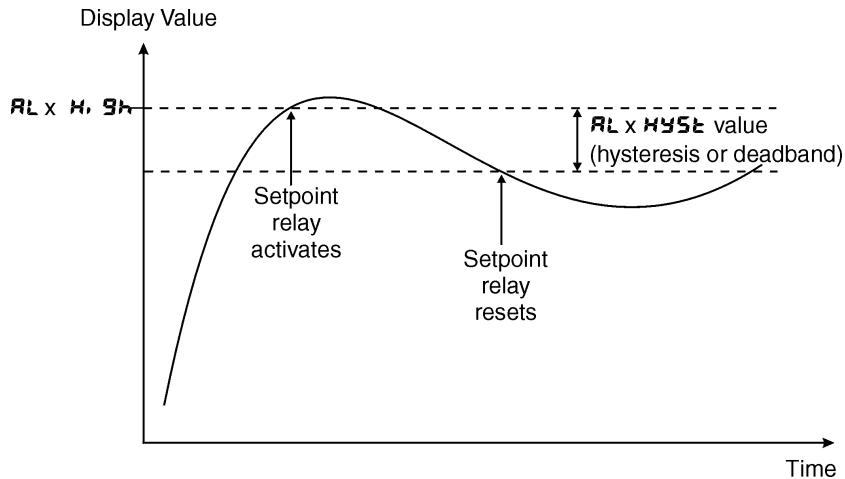
Note if the high alarm value is set lower than the low alarm value the relay will activate between the two i.e. activate in the band between the two values.

5.21   Alarm relay low setpoint

Section:	**AL 1** to **AL 8**
Display:	**Lo**
Range:	Any display value or **OFF**
Default Value:	**OFF**
Default Access Level	**2**
Function number	**40 10** to **40 17**

Displays and sets the low setpoint value for the designated alarm relay. Use this low setpoint function if a relay operation is required when the display value becomes equal to or less than the low setpoint value.

To set the low alarm value press **F** and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection.

The low alarm setpoint may be disabled by pressing the ▲ and ▼ push buttons simultaneously. When the alarm is disabled the display will indicate **OFF**. If the relay is allocated both a low and high setpoint then the relay will activate when the value displayed moves outside the band set by the low and high setpoints. The value at which the relay will reset is controlled by the Hysteresis function.

If the display has annunciator leds for the relay then the annunciator will initially flash in alarm condition, if the alarm is acknowledged by pressing the **F** button (where fitted) or has been acknowledged by a **P**

button or remote input operation the annunciator will be solidly lit until the display moves out of alarm condition.

Example:

If **Lo** under **AL 1** is set to **10** then relay 1 will activate when the display value is 10 or less.
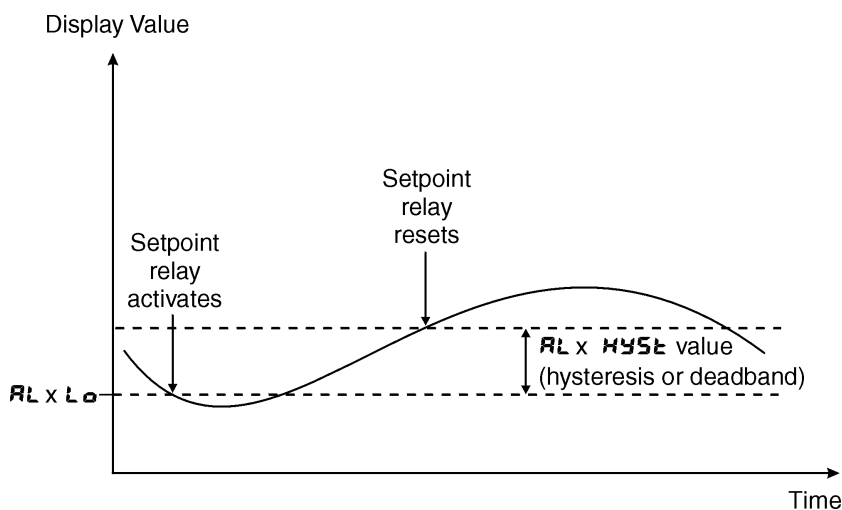
5.22 Alarm relay hysteresis (deadband)

Section:	**AL 1** to **AL 8**
Display:	**HYSt**
Range:	**0** to **6553.5**
Default Value:	**1.0**
Default Access Level	3
Function number	**4020** to **4027**

Displays and sets the alarm relay hysteresis limit for the selected channel. To set a relay hysteresis value go to the **HYSt** function and use the ▲ or ▼ push buttons to set the value required then press **F** to accept this value. The hysteresis value is common to Fault, Low and High setpoint values. The hysteresis value may be used to prevent too frequent operation of the relay when the measured value is rising and falling around setpoint value.

The hysteresis setting operates as follows: For the ascending alarms, once the alarm is activated the input must fall below the setpoint value minus the hysteresis value to reset the alarm. e.g. if **AL 3 Hi 9h** is to **50.0** and **AL 3 HYSt** is set to **3.0** then the channel 4 alarm will activate once the display value goes to **50.0** or above and will reset when the display value goes below **47.0** i.e. at **46.9** or below.

For the descending alarms, once the alarm is activated the input must rise above the setpoint value plus the hysteresis value to reset the alarm. e.g. if **AL 2 Hi 9h** is to **0.0** and **AL 2 HYSt** is set to **10.0** then the channel 5 alarm will activate when the display value falls below **0.0** and will reset when the display value goes above **10.0** i.e at **10.1** or above. The hysteresis units are expressed in displayed engineering units.

5.23 Alarm relay trip time

Section:	AL 1 to AL 8
Display:	trip
Range:	0 to 6553.5 secs
Default Value:	0.0
Default Access Level	3
Function number	4040 to 4047

Displays and sets the alarm trip time in seconds. The trip time is common for both alarm high and low setpoint values. The trip time provides a time delay before the alarm relay will activate when an alarm condition is present. The alarm condition must be present continuously for the whole trip time period before the alarm will activate. If the input moves out of alarm condition during this period the timer will reset and the full time delay will be restored. This trip time delay is useful for preventing an alarm trip due to short non critical deviations from setpoint. The trip time is selectable over 0.0 to 6553.5 seconds.

To set the trip time value go to the trip function, press **F** and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection.

Example: If trip is set to 5.0 seconds then the display must indicate an alarm value for a full 5 seconds before the relay will activate.

5.24 Alarm relay reset time

Section:	AL 1 to AL 8
Display:	rSt
Range:	0 to 6553.5 secs
Default Value:	0.0
Default Access Level	3
Function number	4050 to 4057

Displays and sets the alarm reset delay time in seconds. The reset time is common for both alarm high and low setpoint values. With the alarm condition is removed the alarm relay will stay in its alarm condition for the time selected as the reset time. If the input moves back into alarm condition during this period the timer will reset and the full time delay will be restored. The reset time is selectable over 0.0 to 6553.5 seconds.

To set the reset time value go to the rSt function, press **F** and when you see a digit of the value flash use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection.

Example: If rSt is set to 10.0 seconds then the resetting of alarm relay will be delayed by 10 seconds.

5.25   Relay selection

Section:	**AL 1** to **AL 8**
Display:	**rLYS**
Range:	**On** or **OFF**
Default Value:	**OFF**
Default Access Level	**4**
Function number	**4330** to **4337**

Allows a relay to be allocated to an alarm. For example if a high alarm value has been selected at the **AL 1 Hi 9h** function this alarm could be allocated to relay 3 by selecting **rLY 3 On** at this function. Press the **F** button to enter this function then use the ▲ or ▼ pushbuttons to choose the required relay then press the **F** button to toggle to **On** or **OFF** as required. When relay PI control is used alarm 1 is dedicated to relay 1 and alarm 2 is dedicated to relay 2 so no selection choice will appear when set for PI control.

5.26   Alarm trailing or setpoint mode

Section:	**AL 1** to **AL 8**
Display:	**trL**
Range:	**SEt.P**, **tL 1**, **tL 2**, **tL 3**, **tL 4**, **tL 5**, **tL 6**, **tL 7**
Default Value:	**SEt.P**
Default Access Level	4
Function number	**4060** to **4067**

Each alarm, except alarm 1, may be programmed to operate with an independent setpoint value (**SEt.P** selected) or may be linked to operate at a fixed difference to one or more other alarms, known as trailing operation. The operation is as follows: The operation of each alarm is selectable by selecting, for example, (Alarm 4) **AL4 SEt.P** = alarm 4 normal setpoint or **AL4 tL 1** = alarm 4 trailing alarm 1 or **AL4 tL2** = alarm 4 trailing alarm 2 or **AL4 tL3** = alarm 4 trailing relay 3. For trailing set points the setpoint value is entered as the difference from the setpoint being trailed.

If the trailing setpoint is to operate ahead of the prime setpoint then the value is entered as a positive number and if operating behind the prime setpoint then the value is entered as a negative number.

Notes: If a high (**AL** x **Hi 9h**) trailing alarm is set then this will only follow the high alarm setting of the alarm it is set to trail. Similarly a low alarm will only trail a low alarm of the alarm it is set to trail. It is possible to use trailing alarms with both high and low alarm settings used for each relay.

Example 1 - High alarm: With alarm 2 set to trail alarm 1, if **AL 1 Hi 9h** is set to **1000** and **AL2 Hi 9h** is set to **50** then alarm 1 will activate at **1000** and alarm 2 will activate at **1050** (i.e. 1000 + 50). If alarm 2 had been set at **-50** then alarm 2 would activate at **950** (i.e. 1000 – 50) or above.

Example 2 - Low alarm: With alarm 2 set to trail alarm 1, if **AL 1 Lo** is set to **600** and **AL2 Lo** is set to **200** then alarm 1 will activate at **600** and alarm 2 will activate at **800** (i.e. 600 + 200). If alarm 2 had been set at **-200** then alarm 2 would activate at **400** (i.e. 600 – 200) or below.

5.27 Alarm relay operation input selection

Section:	`AL 1` to `AL 8`
Display:	`Ch`
Range:	`LivE`, `LoAd`
Default Value:	`LivE`
Default Access Level	4
Function number	`4070` to `4077`

Sets the input from which the selected alarm relay will operate. Selections available are:

`LivE` - relay operates from the live value

`LoAd` - relay operates from the load value

To set the alarm relay input selection go to the `Ch` function, press 🄵 and when you see the decimal points flash use the 🔺 or 🔻 push buttons to set the required selection then press 🄵 to accept this selection.

5.28 Alarm relay latching operation

Section:	`AL 1` to `AL 8`
Display:	`Ltch`
Range:	`Auto`, `Ltch`, `A.b`, `L.b`
Default Value:	`Auto`
Default Access Level	4
Function number	`4170` to `4177`

Allows selection of alarm latching operation. If set to `Auto` the alarm relays will not latch i.e. they will automatically reset when the display moves out of alarm condition. If set to `LAtch` the relay will latch and will not reset until the display value is out of alarm condition and either the 🄵 button is pressed to clear the latch condition or if power is removed. The relay hysteresis, trip time and reset time settings still apply to latching relays.

In latching mode the alarm annunciator (if annunciators are fitted) will flash when the display goes into alarm condition. If the display goes out of alarm condition without being acknowledged the flashing period will change to give a longer "off" time. If the alarm is acknowledged by pressing the 🄵 button then the annunciator will change from flashing to solidly lit. Once the alarm has been acknowledged the relay will be free to reset once the display value moves out of alarm condition.

5.29 Alarm relay normally open/closed

Section:	`rL 1` to `rL 8`
Display:	`rLy`
Range:	`n.o`, `n.c`
Default Value:	`n.o`
Default Access Level	4
Function number	`4030` to `4037`

Displays and sets the setpoint alarm relay *x* action to normally open (de-energised) or normally closed (energised), when no alarm condition is present. Since the relay will always open when power is removed

a normally closed alarm is often used to provide a power failure alarm indication. To set the alarm relay for normally open or closed go to the ⌐L 1 to ⌐L 8 ⌐LY function and use the ▲ or ▼ push buttons to set the required operation then press 🄵 to accept this selection. **Example:**
If set to A ln.o alarm relay 1 will be open circuit when the display is outside alarm condition and will be closed (short circuit across COM and N/O terminals) when the display is in alarm condition.

5.30 Relay acknowledge

Section:	⌐L 1 to ⌐L 8
Display:	Ack
Range:	OFF or ON
Default Value:	OFF
Default Access Level	4
Function number	4320 to 4327

If an alarm has been set to latching operation it will not reset until the reading is outside its alarm condition and the operator has acknowledged the alarm by pressing the 🄵 button (where fitted) or using a 🄿 button of remote input to acknowledge the alarm. If the Ack is set to ON the operator can acknowledge the alarm whilst still in alarm condition allowing the alarm to reset automatically when the reading moves outside the alarm condition.

The Ack function is not applicable to DWP relay, relay 1

5.31 Alarm relay Boolean logic operation

Section:	⌐L 1 to ⌐L 8
Display:	bool
Range:	Or, And
Default Value:	Or
Default Access Level	4
Function number	4310 to 4317

This function allows a Boolean logic AND (And) or OR (Or) function to be applied to alarms. If two or more alarms use the same relay and that relay is set to operate as an OR operation then this effectively puts the alarms in parallel. If two or more alarms use the same relay that relay is set to operate on an AND operation then this effectively puts the alarms in series.

Examples: 1. If alarms 1, 2 and 3 all use relay 1 and relay 1 is set for Or operation then relay 1 will activate if the display value for the selected channels for these alarms causes either alarm 1 or alarm 2 or alarm 3 to go into alarm condition. i.e. relay 1 will activate if any of the alarms is in alarm condition.

2. If alarms 1, 2 and 3 all use relay 1 and relay 1 is set for And operation then relay 1 will activate if the display value for the selected channels for these alarms causes alarm 1 and alarm 2 and alarm 3 to go into alarm condition. i.e. all 3 alarms must be in alarm condition for relay 1 to activate.

The bool function is not applicable to DWP relay, relay 1

5.32   Voltage out - option boards

Section:	*E.OUt*
Display:	*OutP*
Range:	*5 U*, *12 U*
Default Value:	*5 U*
Default Access Level	4
Function number	*4428*

This function allows selection of 5V or 12V excitation voltage on option boards which have excitation voltages available. Maximum current is 25mA.

5.33   Automatic display brightness

Section:	*di SP*
Display:	*br9t Auto*
Range:	*OFF* or *On*
Default Value:	*On*
Default Access Level	*2*
Function number	*22FC*

Automatic display brightness adjustment. Applies only to instruments with light sensor fitted. The automatic brightness adjustment uses the optional light sensor to gauge the required brightness level for the environment. The high and low brightness limits are set at the **Auto Hi9h** and **Auto Lo** functions described below.

5.34   Display brightness

Section:	*di SP*
Display:	*br9t*
Range:	*1* to *64*
Default Value:	*63*
Default Access Level	*2*
Function number	*22Fb*

Allows manual adjustment of the display brightness from 1 (lowest brightness) to 63 (highest brightness).

5.35 Dimmed display brightness

Section:	di SP
Display:	dull
Range:	0 to 63
Default Value:	7
Default Access Level	2
Function number	22EC

Displays and sets the manually set level for remote input brightness switching. When a remote input is set to dull the remote input can be used to switch between the display brightness level set by the brgt function and the dimmed display brightness set by the dull function. The display dull level is selectable from 0 to 63, where 0 = lowest intensity and 63 = highest intensity. This function is useful in reducing glare when the display needs to be viewed in both light and dark ambient light levels.

5.36 Auto display brightness high level

Section:	di SP
Display:	Auto Hi9h
Range:	16 to 64
Default Value:	63
Default Access Level	2
Function number	22EA

Automatic brightness high level - seen only when brgt Auto is set to ON. The high brightness level sets the maximum brightness which the automatic brightness control can achieve with 64 being the highest intensity.

5.37 Auto display brightness low level

Section:	di SP
Display:	Auto Lo
Range:	1 to 64
Default Value:	7
Default Access Level	2
Function number	22Eb

Automatic brightness low level - seen only when brgt Auto is set to ON. The low brightness level sets the minimum brightness which the automatic brightness control can achieve with 64 being the highest intensity and 0 being the lowest intensity.

5.38   Front P button operation mode

Section:	*r.I NP*
Display:	*P.but*
Range:	*NONE*, *P.HI*, *P.Lo*, *HI .Lo*, *AL.Ac*, *ZEro*
Default Value:	*NONE*
Default Access Level	4
Function number	*4720*

Sets the operation mode for front P button. Functions available are identical to the same functions used in the *r.I N. I* to *r.I N.4* functions.

5.39   Remote input 1 operation mode

Section:	*r.I NP*
Display:	*r.I N. I*
Range:	*NONE*, *P.HI d*, *d.HI d*, *P.HI*, *P.Lo*, *HI .Lo*, *AL.Ac*, *ACCS*, *P.but*, *F.but*, *U.but*, *d.but*, *duI I*, *ZEro*
Default Value:	*NONE*
Default Access Level	4
Function number	*4721*

Sets the operation mode for remote input 1 terminal at the rear of the instrument. Choices are as follows:
NONE - If this option is selected then remote input 1 will have no function.

P.Hol d - peak hold. The display will show the peak value (highest positive value) only whilst the remote input terminals are short circuited i.e. the display value can rise but not fall whilst the input terminals are short circuited. The message *P.HLd* will appear briefly every 8 seconds whilst the input terminals are short circuited to indicate that the peak hold function is active.

d.Hol d - display hold. The display value will be held whilst the remote input terminals are short circuited. The message *d.HLd* will appear briefly every 8 seconds whilst the input terminals are short circuited to indicate that the display hold function is active.

P.HI - peak memory. The peak value stored in memory will be displayed if the remote input terminals are short circuited, if the short circuit is momentary then the display will return to normal measurement after 20 seconds. If the short circuit is held for 2 to 3 seconds or the power is removed from the instrument then the memory will be reset.

P.Lo - valley memory. The minimum value stored in memory will be displayed. Otherwise operates in the same manner as the *P.HI* function described above.

HI .Lo - toggle between *HI* and *Lo* displays. This function allows the remote input to be used to toggle between peak and valley memory displays. The first operation of the remote input will cause the peak memory value to be displayed, the next operation will give a valley memory display. *P.HI* or *P.Lo* will flash before each display to give an indication of display type.

AL.Ac - alarm acknowledge. Allows the remote input to be used to acknowledge a latching alarm. See the **Ltch** function.

ACCSS - remote input access. Allows the remote input to be used for access control purposes. See the **Function Access** section in the Windows software.

P.but - allows the selected remote input to act as the 🅿 pushbutton.

F.but - allows the selected remote input to act as the 🄵 pushbutton.

U.but - allows the selected remote input to act as the 🔼 pushbutton.

d.but - allows the selected remote input to act as the 🔽 pushbutton.

dull - remote input brightness switching. When this mode is selected the display brightness will be switch from the brightness level set at the **di SP brGt** to the brightness level set at the **di SP dull** function. This function is generally used to switch between daylight and night time viewing brightness requirements thereby avoiding glare when light levels are low.

ZErO - remote input zero. Allows the remote input to be used to zero the display.

5.40   Remote input 2 operation mode

Section:	**ri nP**
Display:	**ri n.2**
Range:	**nOnE**, **P.HI d**, **d.HI d**, **P.HI**, **P.Lo**, **HI .Lo**, **AL.Ac**, **ACCS**, **P.but**, **F.but**, **U.but**, **d.but**, **dull**, **ZErO**
Default Value:	**nOnE**
Default Access Level	4
Function number	**4722**

Remote input 2 functions. Same choices as **ri nP ri n. 1** apply.

5.41   Remote input 3 operation mode

Section:	*r.i nP*
Display:	*r.i n.3*
Range:	*nOnE*, *P.Hi d*, *d.Hi d*, *P.Hi* , *P.Lo*, *Hi .Lo*, *AL.Ac*, *ACCS*, *P.but*, *F.but*, *U.but*, *d.but*, *dui i* , *ZErO*
Default Value:	*nOnE*
Default Access Level	4
Function number	*4723*

Remote input 3 functions. Same choices as *r.i nP r.i n. i* apply.

5.42   Remote input 4 operation mode

Section:	*r.i nP*
Display:	*r.i n.4*
Range:	*nOnE*, *P.Hi d*, *d.Hi d*, *P.Hi* , *P.Lo*, *Hi .Lo*, *AL.Ac*, *ACCS*, *P.but*, *F.but*, *U.but*, *d.but*, *dui i* , *ZErO*
Default Value:	*nOnE*
Default Access Level	4
Function number	*4724*

Remote input 4 functions. Same choices as *r.i nP r.i n. i* apply.

5.43   Error Messages

¯d.o¯ - Display overrange. This indicates that the positive value to be displayed has too many digits to be displayed e.g. you cannot display 199999 on a 5 digit display.

¯d.u¯ - Display underrange. This indicates that the negative value to be displayed has too many digits to be displayed e.g. you cannot display -2999 on a 4 digit display.

¯or¯ - overrange message - This error message is seen if the input signal is above the range of the sensor or the measuring range of the display.

¯ur¯ - underrange message - This indicates that the input is below the range expected for that input.

Int FF02 - this message indicates that the power has been cycled on and off too quickly i.e. switched off then on again quickly. The display will normally recover from this on its own and proceed to normal operation.

CAL FAIL - this indicates that the calibration attempt has failed. Check that the input has changed by at minimum 10% of the range setting between calibration points. The **FSd** display can be used to check the percentage change between calibration lifts.

Hardware Error Messages

E 1 - display segment voltage high
E2 - display segment voltage low
E3 - 5VDC on circuit board high
E4 - 5VDC on circuit board low
E5 - Unregulated voltage high
E6 - Unregulated voltage low
E7 - display segment second voltage high
E8 - display segment second voltage low
E9 - PCB error i.e. software does not match pcb

6 Windows Software Introduction

The Window software is designed for use with Windows operating systems (not Vista). The software allows viewing of live data, viewing and exporting data from the instruments internal data logger memory and data logging directly to a file using the computer hard drive for storage. The software also allows configuration of operating parameters and remote calibration if required.

Data logged on the hard drive is saved as a comma separated ".csv" file allowing it to be opened by most spreadsheets.

Once the data has been downloaded from the internal data logger memory it can, if required, be exported for use in a word processor, spreadsheet or database. This section covers the main windows required for setup, the function of the remaining windows should be self explanatory or easy for the user to test for themselves.

In addition to the Windows software the logged data may be downloaded via the instruments web page. The web page can be viewed by typing in the web address of the instrument into a browser or the Windows software also has a link to the web page via **File** > **View** > **Web Pages**.

6.1 Installation

The software will be supplied for download via a download link issued this instrument is purchased. Once installed double click on the icon to start the program. A window similar to the one below should then appear.

Some of the functions in this software are also available via the instruments pushbuttons, see the **Function Table** and **Explantion of Functions** chapters for further description where applicable.

6.2   Overview of main software menus

The diagrams which follow show the main setup menus for the software.
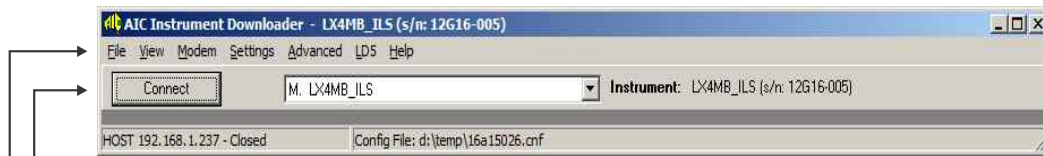
IP Address of unit   Configuration file location

Connect button - for single connection to one instrument.
This button will not be seen when multiple instruments are selected for connection.

File - sub menus:
    Open - allows selection of file associated with this software to open
    e.g. datalog file (.dlog) or programming file (.atg) etc.
    New Config - allows setup of a new configuration file i.e. new settings file
    Open Config - opens an existing configuration file
    Save Config As - save configuration file with new name
    (file is automatically saved with old file name when program closes)
    Exit - closes program

View - sub menus:
    Live Data - view live data, also allows logging of data to PC drive
    Web Pages - allows viewing of the instrument web pages
    LSR LOG - allows viewing, download or export of data log files
    Event Log - allows viewing, downloading and export of event logs
    Download All - allows downloading of data and event logs together
    Instrument Properties - view details of instrument connected
    Time Configuration - allows viewing, setting of date and time etc.
    Ethernet Config - allows viewing, setting of Ethernet settings
    Web Server Config - allows viewing, setting of Web Server setting
    Password Configuration - see **Passwords** section which follows
    LSR LOG Properties - view data logger settings
    Event Log Properties - view event logger settings

Modem - sub menus:
    Connect - allows entry of phone number & description
    Disconnect - disconnects modem
    Setup - allows entry of required modem parameters

Settings - sub menus:
    Unit Address - allows setting of unit address number and comms testing
    (this menu will not be seen if multiple instrument connection is selected)
    Abus Discovery - detects and shows all devices connected via A.buS
    Comms - allows access to serial and Ethernet communications settings
    Instrument Setup - allows setup of multiple instruments or instruments
    without **A.buS** option
    Output Files/Directories - allows setup of working directories and
    exported file directories, extensions etc..
    Plugin Path - allows selection of directory which contains plugin files.
    Default Chart Colours - allows selection of colours to be used for graphs.

Advanced - see next diagram
LD5 - see next diagram
Help - see next diagram

File   View   Modem   Settings   Advanced   LD5   Help

Connect   M. LX4MB_ILS   ▼   **Instrument:** LX4MB_ILS (s/n: 12G16-005)

HOST 192.168.1.237 - Closed   Config File: d:\temp\16a15026.cnf

File, View, Modem, Settings - see previous diagram

Advanced - to view the Advanced menu press and hold the Ctrl button on the computer keyboard then go to **Settings** and tick **Enable Advanced Mode**.

Advanced - sub menus:

Save/Restore Config. (ABUS Files) - allows all internal memory settings for the instrument to be saved and, if requried, restored at a later time.

Flash Programmer - brings up the flash programmer menu which allows program updates to be installed.

Upload Web Server Config File - brings up the flash programmer menu which allows web page updates to be installed.

Function Table Config - allows viewing of all functions in the function table and if required resetting these functions back to default values

Remote Access - allows remote access to instrument by AIC if this has been set up.

Calibrate - allows the unit to be calibrated via the Windows software.

LD5 - sub menus:

Load Display - Shows live weight reading in calibrated units and as a percentage, shows status of digital inputs (Up, Down, North etc) and shows Design Working Period status

Load Statistics - shows graph of lifts against load percentage, duration etc

DWP Config - this menu contains the main parameters for viewing and setting of hoist/crane parameters

Input Config - allows viewing and setting of input parameter such as excitation, sample rate etc.

Alarms - allows viewing and setting of alarm parameters

Relays - allows viewing and setting of relay parameters

Peak Display - allows peak values to be viewed and reset

Display Brightness - allows viewing and setting of display brightness controls

Remote Inputs - allows viewing and setting of remote input settings

Digital Inputs - allows viewing and setting of the digital input electrical parameters for the 4 remote input connectors on the main circuit board

Modbus Config - allows viewing and setting of Modbus map

Function Access - allows viewing and setting of access levels.

Help - sub menus:

System Report - allows production of a .txt file showing system settings

System Report (with Device Settings) - allows production of a .txt file showing system settings and all the instruments function settings

Email System Report - allows system report to be emailed

Email System Report (with Device Settings) - allows the selected report with device settings to be emailed

About - shows details of the PC software version etc.

6.3 Passwords

Provision is made for 3 levels of password protection to avoid unauthorised access to changing function settings. If a password has been set for example in the **LD5** > **Input Config** window the various input configuration settings can be seen but are "grayed out" i.e. cannot be changed unless the user goes to **Tools** > **Enter Password** and enters the appropriate password. Once the appropriate password is entered the user can change the settings they have been allowed access to. To view and alter the password settings go to **View** > **Password Configuration**. The window below will appear showing the 3 password levels and associated access levels.

The 3 levels are:

Password 1 - by default this is blank and is the lowest level password. If this is left as blank with **Admin** access then anyone can change setting, reset the datalogger memory etc. Set this to a different password or access level if you wish to restrict access to functions and resets. The level of access allowed by this password is set in the drop down menu to the right of the password.

Password 2 - by default this is **Password**. The level of access allowed by this password is set in the drop down menu to the right of the password.

Password 3 - by default this is **MasterPWD**. This is the master password level and will allow access to all functions.

In order to change the passwords or other settings in this window the user must go to **Tools** > **Enter Password** and enter the master password i.e. Password 3. If the master password is changed from **MasterPWD** then it is important that a note is made of the new password as the instrument will have to be returned to the manufacturer to restore the passwords to default values.

6.4   Calibrate window

The **Calibrate** menu is found under **Advanced** > **Calibrate**. If you cannot see the **Advanced** section on the main menu then hold down the "Ctrl" key on your computer keyboard and with the key pressed click on **Settings** > **Enable Advanced Mode**.

An example of the Calibrate menu is shown below.
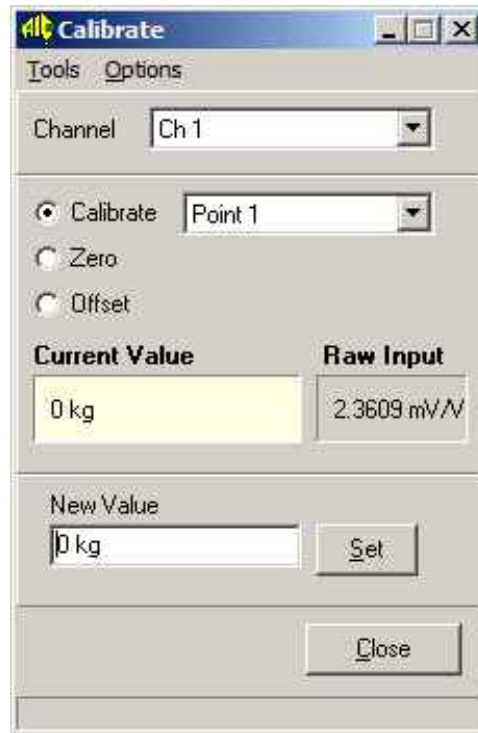
Under **Tools** > **Uncalibrate** you can clear all previous calibrations in memory and set the display to show its default calibration of 100 displayed per each 1mV/V input. If calibration difficulties are experienced the Uncalibrate function can be used to clear the calibration memory.

This window allows selection of Point 1 and Point 2 for a 2 point calibration. With **Calibrate** selected and **Point 1** in the window you can see the current reading for this input and the mV/V input seen at the input and the **New Value** window allows a new display value for that input to be entered (note password entry may be required under **Tools** > **Enter Password** to allow any change to be made). Press the **Set** button when ready to enter the new value. When the load has been changed **Point 2** can be selected and a new value for the second input entered. The zero point reference used for zero range operations will also be reset at this time, if Point 1 was not a zero load input then the instrument will calculate from the slope obtained from Points 1 and 2 what the mV/V input is for a zero load i.e. the memory of previous zero operation cleared.

This window also allows a **Zero** and **Offset** operation. The **Zero** operation allows the display valued to be zeroed for the current input. The zero point reference used for zero range operations will also be reset at this time.

The **Offset** operation can be used if a consistent error is found to exist in the reading e.g. the display is reading 100 kg over weigh for all readings. To use the **Offset** operation click on **Offset**, the current display value will be seen and you can enter a new value for this input and click on **Set** to accept this.

6.5   Live Data Menus

Found under **View** > **LSR Live Data**. This menu allows viewing of live load data. Also from this menu the live readings can be directly stored to hard drive as a .csv file using **Tools** > **Start Logging** and **Tools** > **Stop Logging**. The graph can be printed via **File** > **Print Graph**.
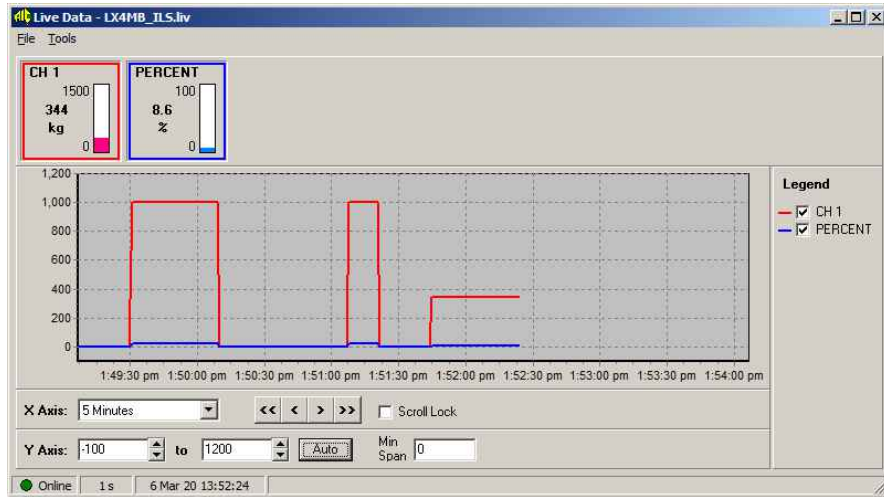
6.6   Web Page Menus

Found under **View** > **LSR Web Pages**.
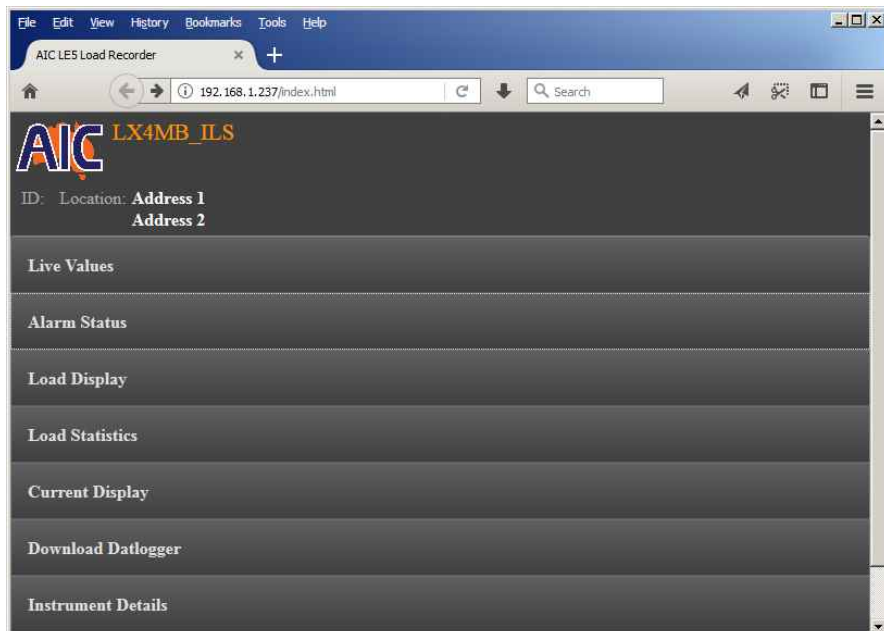
The Web Page Menus can be viewed by typing the instruments web address into a browser but can also be viewed via the PC software at **View** > **Web Pages**.

A typical page from the Web Menu is shown below.

6.7   LSR Logs Menu

Found under **View** > **LSR LOG**. The logs show date and time of lifts. Go to **Tools** > **Download** to see the download options.

Most columns in the download file are self explanatory but the final column **Dig In** shows the decimal equivalent of the state of digital input switches during the lift. For example a Dig In value of 5 indicates digital inputs 1 and 3 were active i.e. binary 101. A Dig In of 33 indicates digital inputs 1 and 6 were active i.e. binary 100001.

To export the file in a format which can be read by other programs e.g. in .csv format go to **Tools** > **Export** to see the options.

If the lift is active for more than 10 minutes the lift will be split into separate logs of up to 10 minute duration e.g. if a lift is active for 30 minutes this will be logged as 3 lifts.

6.8 Load display

Found under **LD5** > **Load Display**. This display shows the current load and load as a percentage of full load, the digital input status UP, Down etc. plus other DWP details. An example page is shown below.
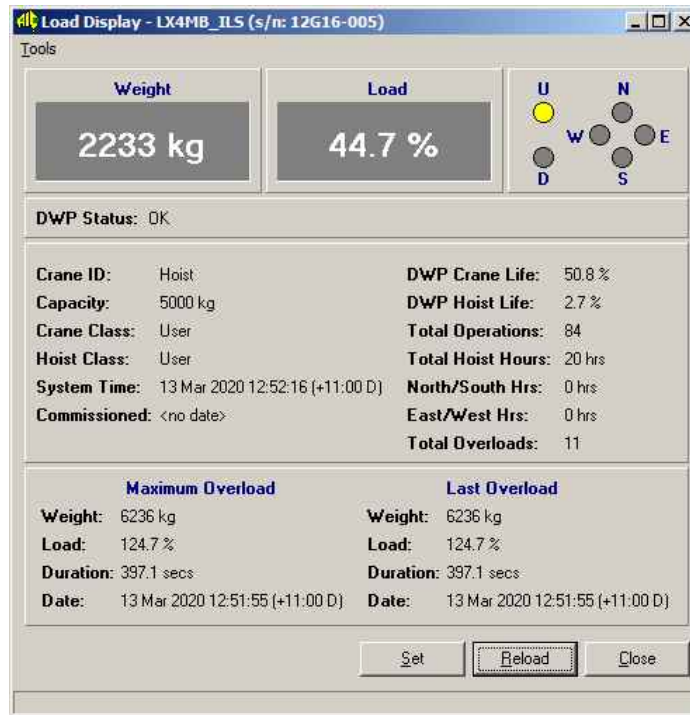
6.9 Load Statistics display

Found under **LD5** > **Load Statistics**. This window allows viewing in bargraph form the Lifts By Load, Lifts By Duration, Lifts By Weekday and Lifts By Time Of Day on separate pages. An example page is shown below.
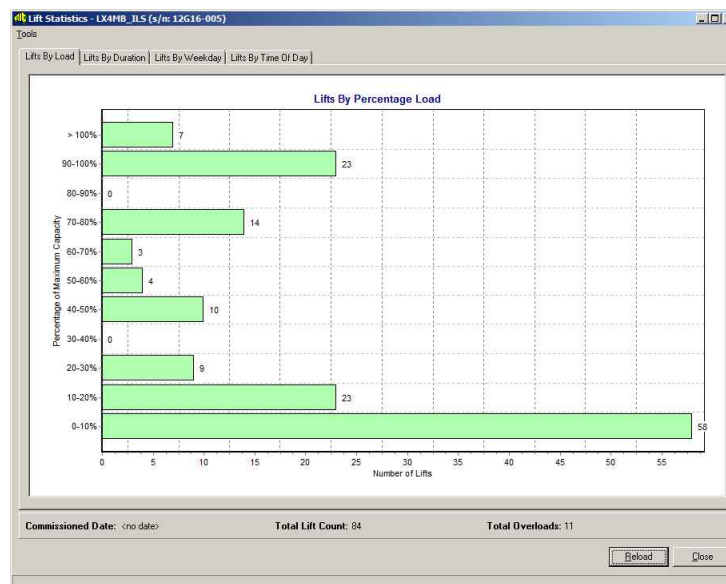
6.10 Design Working Period Configuration display

Found under **LD5** > **DWP Config**. This display shows the current configuration for the crane, hoist, DWP, Overloads and other parameters. Access may require entry of a password under **Tools** > **Enter Password**, this will depend on how the passwords have been set).

The **Commissioned** date can be set manually or the **Set Commissioned to Todays Date** box ticked.

Once the crane and hoist class has been entered the DWP operations and DWP hours corresponding to those classes will be automatically set. Most of the parameters can be altered for one hour of run time before the settings are locked. It may be useful to alter the values to match a unit being replaced due to damage. An example page is shown below.

If digital input DI1 is set for **Lift** signal input then digital input D12 will be used to signal **Return**. If digital input DI1 is set for **Run** then digital input DI2 will be used to signal **Direction** i.e. Up or Down. The choice or Lift or Run methods is up to the user.

The **Log Threshold** under **Data Logging** set the load threshold for logging purposes. For example is set to 20 then loads under 20 percent will not be logged.

The **Reset Counters** box can only be used before the lockout time is exceeded.

6.11 Input Configuration display

Found under **LD5** > **Input Config**.

This window allows configuration of various input parameters. Sample rate is fixed 10 samples per second. Up to two custom display units can be added. When a custom display unit is entered it will be added to the drop down list of available units under **Channel 1** in this window. Most of the functions in this menu are available via the instruments pushbuttons, see the **Function Table** and **Explantion of Functions** chapters for further description.

6.12 Function Access menu

Found under **LD5** > **Function Access**. The use of the access control is mainly explained in the "Introduction" section of this manual. The **Custom Function Access** section allows the access level of functions to be altered. To change the access level select the function number for the required function (each function is given an access level shown in the **Explanation of Functions chapter**) under **Function Code** in this window then enter the access level required in the **Access Level** drop down menu. Selecting "Default" sets this back to the default level shown in the **Explanation of Functions** chapter for each function. For example the function code for alarm 1 high setpoint is 4000. If this 4000 is entered as the **Function Code** and a new access level is selected then alarm 1 high access level will now be set to the new level. If the **Repeat** section for this is set to **Off** then only alarm 1 high will be changed but if it is set to **On** then if more than one alarm has been set then all alarm high access levels will be set to the new level. This **Custom Function Access** is particularly useful in allowing choice of just a few functions for **Easy Access**. For example no function has a default access level of 1 so if you only want access to a few functions you want to regularly change then set those functions to **Access Level** 1 and set the **Easy Access** mode **Default** to 1 also.

6.13 Remaining menus

The remaining menus under **LD5** i.e. **Alarms, Relays, Peak Display, Display Brightness, Remote Inputs, Digital Inputs** and **Modbus Config** should be self explanatory, see the "Overview of main software menus" section at the beginning of this chapter for brief descriptions. Some of the functions in these menus are available via the instruments pushbuttons, see the **Function Table** and **Explantion of Functions** chapters for further description. Note the **Free Fall** window and the **Mode** window in the **Alarms** menu is not applicable to this software version. The **Mode** should be set to **Hi/Lo**.

7 Specifications

7.1 Technical specifications

Input types:	4 or 6 wire mV/V output load cell
Communications:	Ethernet
Data logs:	Up to 266,444 log records
Sample rate:	10 samples per second
Accuracy:	Better than 0.005% (2.5 to 10mV/V)
Resolution (bits):	16.6 @ 40mV/V, 15.8 @ 20mV/V, 16.5 @ 10mV/V, 16.1 @ 5mV/V, 15.6 @ 2.5mV/V, 15.7 @ 1.2mV/V, 15.1 @ 0.6mV/V, 14.1 @ 0.3mV/V
Thermal stability:	25ppm per ^{o}C
Ambient temperature:	LED -10 to 60° C
Humidity:	5 to 95% non condensing
Power supply:	100 and 200mm LED: AC 240 or 110V selectable, 50/60Hz or AC 48/42/32/24 selectable, 50/60Hz or DC isolated wide range 12 to 24V. 20mm, 38mm, 45mm, 57 or 58mm LED: AC 240/110V 50/60Hz or AC 24 to 48V 50/60Hz or DC 12 to 48V isolated or DC 24V non isolated Supply type is factory configured
Output (standard):	4 x relays, 1 x Form C (dedicated to DWP use), 3 x Form A rated 5A resistive. Programmable N.O. or N.C.

Optional outputs - some options below are available in combination

Extra relays:	4 extra relays, form A
Analog retransmission:	Single 4 to 20mA 12 bit or 16 bit versions Single 4-20mA, 0-1VDC or 0-10VDC (user selectable), 16 bit (4-20mA will drive into resistive loads of up to 800Ω)
Serial communications:	RS485 isolated 8 bit (ASCII or Modbus RTU functions 1 and 3) RS232 serial comms. 8 bit (ASCII or Modbus RTU functions 1 and 3) USB port, micro USB USB port - external IP65, type B (20mm to 58mm display types only)

7.2 Physical characteristics

Refer to "Mechanical installation", chapter 2 page 10 for size and weight specifications.

8 Guarantee and service

The product supplied with this manual is guaranteed against faulty workmanship for a period of 2 years from the date of dispatch.

Our obligation assumed under this guarantee is limited to the replacement of parts which, by our examination, are proved to be defective and have not been misused, carelessly handled, defaced or damaged due to incorrect installation. This guarantee is VOID where the unit has been opened, tampered with or if repairs have been made or attempted by anyone except an au authorised representative of the manufacturing company.

Products for attention under guarantee (unless otherwise agreed) must be returned to the manufacturer freight paid and, if accepted for free repair, will be returned to the customers address in Australia free of charge.

When returning the product for service or repair a full description of the fault and the mode of operation used when the product failed must be given. In any event the manufacturer has no other obligation or liability beyond replacement or repair of this product.

Modifications may be made to any existing or future models of the unit as it may deem necessary without incurring any obligation to incorporate such modifications in units previously sold or to which this guarantee may relate.